KYOCERA

YASHICA

270 Auto Focus
230-AF SUPER

Repair Manual

KYOCERA CORPORATION

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A GENERAL & TECHNICAL INFORMATION

YASHICA 270 AUTO FOCUS PRIMARY FEATURES INCLUDE:

1.PREDICTIVE AUTO FOCUS CONTROL

When shooting in either the Continuous or Trap Focus AF mode, the advanced-autofocus function automatically activates. This function senses a subject coming to or going away from the camera at almost the same speed, predicts the focus shift where subject will be when the shutter will be tripped, and adjusts the lens for that moment so that the subject will be sharply focused.

2.ZONE SELECTOR FOR SPEEDY AF

To speed up autofocusing even further, the 'camera-to-subject distance changeover button' (AF Zone Selector) can be used to select between Far distance Mode [about 3m(9.8ft) to infinity] and Near-distance Mode [up to about 3m(9.8 ft)] shooting over the Full-range Focusing Mode [closest point (lens dependent) to infinity]. By limiting the AF working range in this way, the time required for focusing is shortened. This can be especially effective when using a telephoto or a macro lens.

3.TRAP FOCUSING, HANDY FOR UNMANNED NATURE PHOTOGRAPHY

This autofocusing mode (also known as freeze focus) captures the subject in fine focus when it enters the preset focusing distance from the camera, automatically triggering the shutter. The camera can be set up, the focus and picture framing set, and then left unmanned. Such an approach is highly useful in normally hard to get nature shots when a wild animal is in motion or won't appear when humans are around.

4.AF SUPPLEMENTARY LIGHT ASSISTS IN DIM LIGHTING SITUATIONS

To enhance the operation of the autofocusing system when lighting is quite dim (making TTL phase contrast detection by the AF CCD difficult), a near-infrared beam is automatically emitted to allow the AF system to function rapidly and effectively.

5.BUILT-IN POP-UP FLASH

A small, yet sufficiently powerful flash unit (on the top of the camera) conveniently can be popped up when flash photography is desired. However, should supplemental or more powerful flash be required, the new YASHICA CS-240 AUTO (w/wide panel) is optionally available.

6.EASY SLOW-SHUTTER FLASH SYNCH SELECTION

By simply using the AE/L button, slow-shutter flash synch photography allows for use of slower shutter speeds that make the most of particularly natural mood, background or night scene lighting (such as when the flash will cover a person in the foreground against an evening city skyline).

7.PRE-FLASH REDUCES RED-EYE

The first burst of light emitted just prior to the second actual flash helps reduce the chance of red-eye appearing in photographs. This unintentional and usually unexpected phenomenon where the subject's eyes come out an almost red

sometimes occurs when a flash photo is taken in dim lighting situations.

8.FOUR EXPOSURE MODES (Tv, Av, Program, Manual) PLUS AUTOMATIC BACKLIGHT COMPENSATION

Conveniently, a quick choice can be made from four exposure modes: Tv (shutter-priority AE), Av (aperture-priority AE), Program [one of two built-in Programmed AE modes is automatically set dependent on the lens mounted, and either can be shifted between "Low" (slow shutter speeds) and "High" (faster shutter speeds) at the same EV value.], or Manual. When there is a backlit subject in the center of the picture frame, the main subject will generally be underexposed because exposure is measured mainly on a bright background. This camera will automatically compensate for this condition to prevent the main subject from being underexposed.

YASHICA 270 AUTO FOCUS SPECIFICATIONS

Type: 35mm focal-plane shutter, auto-focus SLR camera.

Picture Size: 24 X 36mm.

Lens Mount: YASHICA AF mount.

Shutter: Vertical-travel metal focal-plane shutter.

Shutter Speeds: Auto ----- 8sec.~1/2000sec.;
Manual----B,8sec.~1/2000sec.

Shutter Release: Electromagnetic release,provided with special release socket.

Exposure Control: Six modes of exposure control------
①Programmed auto exposure (PROGRAM)
②Aperture-priority auto exposure (Av)
③Shutter-priority auto exposure (Tv)
④Manual exposure
⑤CPU flash control with built-in flash
⑥External flash

Metering System: TTL center-weighted average light metering.

Metering Range: EV 1~20 (ISO 100, f/1.8 lens).

Film Speed Setting: Automatic with DX-coded film, ISO 25~5000 (1/3-step); the film speed is automatically set to ISO 100 with non-DX film.

Auto-focus System: TTL phase difference detection with CCD sensor module located in lower part of mirror box; focusing range limited by focusing range selector, focusing is effected by depressing the shutter release halfway; manual focusing possible; green LED turns on when the subject is in sharp focus; provided with AF auxiliary light and action-foreseeing focus control function.

Auto-focus Sensing Range: EV 2~19 (ISO 100).

Focusing Modes: Auto-focus, continuous auto-focus, trap focus, Manual focus (MF).

Focus Lock: Activated by the AF Lock button. The focus is also locked by depressing shutter release halfway in the single-frame mode, after the subject is sharply focused.

AE-Lock: Activated by AE Lock botton; quantity of light on subject is stored in memory.

Exposure Compensation: +2EV ~ -2EV (1/2-EV steps) with automatic backlight compensation.

Self-timer: Electronic self-timer with 10sec. delay; can be stopped after it has started; operation is indicated by self-timer LED and electronic sound.

Flash:	Built-in flash, aperture control with distance information; guide number: 11 (ISO 100·m); recycling time: about 2.5 secs.; illumination angle: Covers the field of view of 35mm lenses; pre-flash capability for reducing red-eye effect. ● Flash mark "ϟ" turns on in the viewfinder when flash is fully charged. ● Flash mark "ϟ" blinks when the subject is not within flash effective range. External flash can also be used (but not with built-in flash).
Viewfinder:	Pentaprism eye-level finder, 95% field of view, 0.82X magnification (with 50mm lens at infinity).
Focusing Screen:	Standard matte screen with focusing frame, interchangeable screens available.
Display in Viewfinder:	Focusing frame; sharp focus LED (green LED); Program mark; flash mark; exposure warning LED (red).
Display Panel:	Exposure mode, shutter speed,aperture, focusing range indicator, exposure compensation, battery warning mark, exposure counter, film advance/rewinding mark, drive mode mark (□, ▣, ⏲, ◈), ISO indicator.
Film Loading:	Auto loading;film advances automatically to frame No.1.
Film Advance:	Automatic with built-in motor.
Film Rewinding:	Automatic with built-in motor, automatic stop when rewinding is completed; film can be rewound in mid-roll.
Exposure Counter:	Automatic resetting, additive type.
Accessory Shoe:	Direct X-contact hot-shoe (with dedicated flash contacts); synchronizes at 1/90sec. or slower
Drive Mode:	Single-frame, continuous shooting, self-timer, and trap-focus modes can be selected; continuous shooting up to about 1.8 frames/sec.
Camera Back:	Can be opened by pushing down camera back lock; detachable; provided with film check window.
Power Source:	One 6V lithium battery (2CR5).
Battery Check:	Automatic check; battery check mark shows when battery voltage is reduced.
Battery Capacity:	About 25 rolls of 24-exposure film can be exposed in AF mode (50% with flash) at ordinary temperature—according to our testing standards.
Others:	Direct contact for data.
Dimensions:	148(W) X 109(h) X 59.5(d)mm (5-13/16x4-5/16x2-1/4 in.)
Weight:	Camera body ---- 625g(21.4oz.) (without battery)

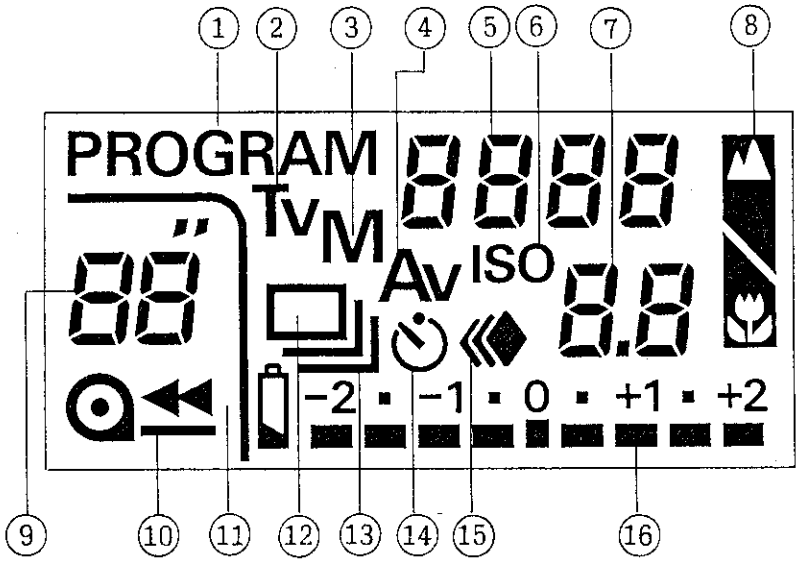
LCD INFORMATION AND VIEWFINDER

(1) LCD Display Panel

The easy to read LCD panel displays all the photographic information (focusing range indicator, exposure mode, shutter speed, aperture, exposure compensation indicator, etc.) needed to greatly enhance operating ease.

* (The display shown here includes all information fields, some of which would not actually appear at same time.)

Display in the Viewfinder



① Programmed Auto Exposure Indicator
② Shutter speed-priority Auto Exposure Indicator
③ Manual Exposure Indicator
④ Aperture-priority Auto Exposure Indicator
⑤ Shutter Speed/Film Speed
⑥ ISO Indicator
⑦ Aperture Value
⑧ Focusing Range Indicator
⑨ Exposure Counter
⑩ Film Advance/Rewinding Mark
⑪ Battery Warning Mark
⑫ Single-frame Shooting Mode Indicator
⑬ Continuous Shooting Mode Indicator
⑭ Self-timer Mode Indicator
⑮ Trap Focus Mode Indicator
⑯ Exposure Compensation Indicator

[Display of film counter, film advance / rewind mark]

* After film loading, the mark ⊙— is displayed as long as the back cover is closed.

* During film rewinding, the rewind mark ⊙⇇ is displayed.

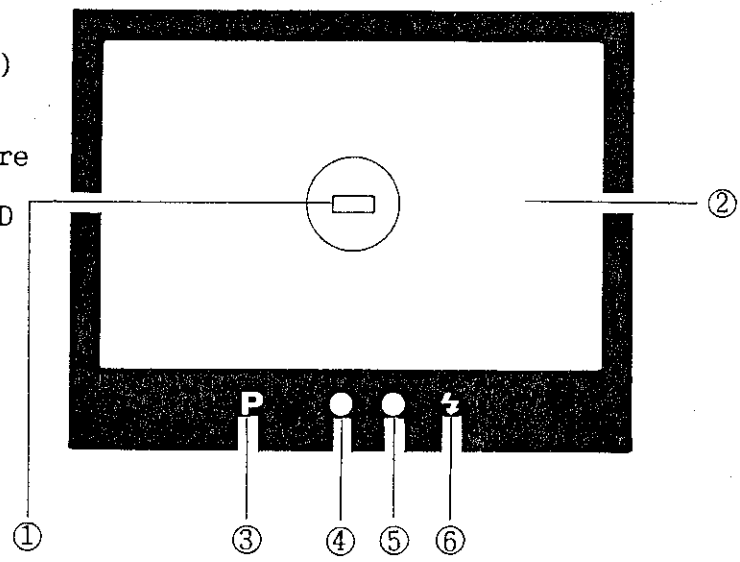
* The frame count at the end of film winding and that during rewinding are displayed in ◯ .

		Display
Back cover	Open	0
	Close(Blank shot advance)	
Blank shot advance (with film)		1 ⊙—
Blank shot advance (without film)		0
Winding (with film)		1 ⊙— ～ 99 ⊙—
Winding (without film)		0
Film end		◯ ⊙—
Rewinding		◯ ⊙⇇
Rewind completed		0 ⊙
Back cover	Open	0
	Close	0

(2) Display in the Viewfinder

The viewfinder display conveniently enables checking of essential data while keeping the subject in view. A green "P" lights when the exposure mode is set to the programmed AE, and blinks when the program is shifted. When focusing even manually, the green "sharp-focus" LED operates.

① Focusing Frame
② Matte Screen
③ Program Mode Mark ("P" in green)
④ Sharp Focus LED (green)
⑤ Exposure Warning LED (red)
  (A) Camera Shake/Incorrect Exposure Warning LED
  (B) Correct Exposure indicator LED
⑥ Flash Mark



10) Install the B Gear (16867200) on the Winding Base Plate Lower (B).

11) Turn the Ratchet Arm in the direction of the arrow (See Fig.70), combine the Winding Base Plate Lower (B) Ass'y with the Winding Base Plate Lower (A) Ass'y, and tighten the Winding Base Plate Lower (B) Setscrews (69113076) X3.

12) Install the CL Gear (16863010) and CL Gear Spring (16863210) on the Winding Base Plate Lower (B) Ass'y.

13) Attach the RW Gear (Left) (16864511) and the Winding Base Plate Lower (C) Ass'y (168A2600) to the Winding Base Plate Lower (B) Ass'y, and tighten the Winding Base Plate Lower (C) Setscrews (61802526) X3.

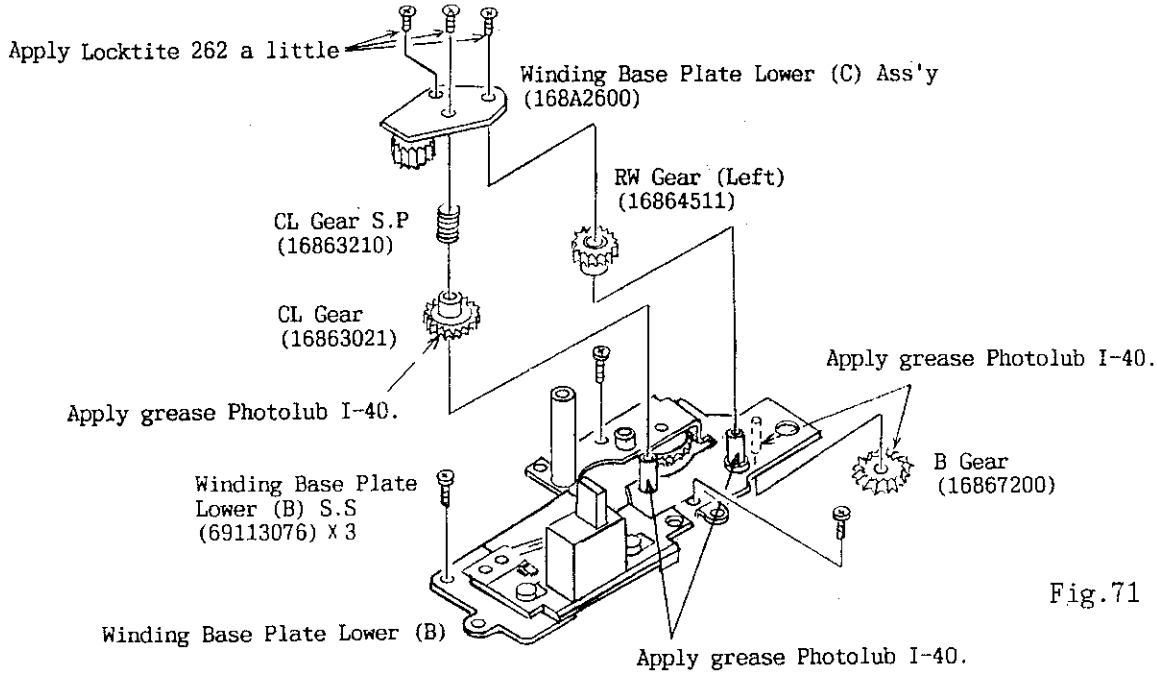


Fig.71

[Application of Grease to Winding Base Plate Lower (B) Ass'y]

*Apply grease Photolub I-40 to the shafts for the gears.

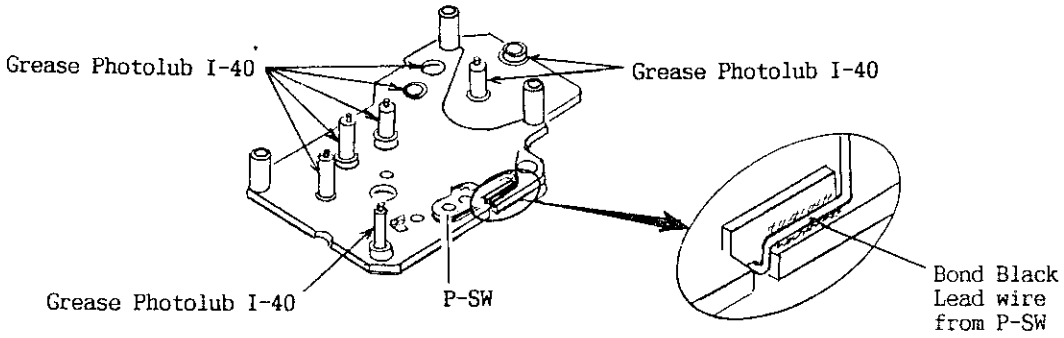


Fig.72

C-1-3 Rewind Base Plate Upper Ass'y

1) Install the RW Gear 3 (16868500), RW Fork Spring (16868710) and Rewind Fork (37862701) on the Rewind Base Plate Upper, and tighten RW Fork Setscrew (66001042).

2) Check to make sure that the RW Gear turns smoothly without catches.

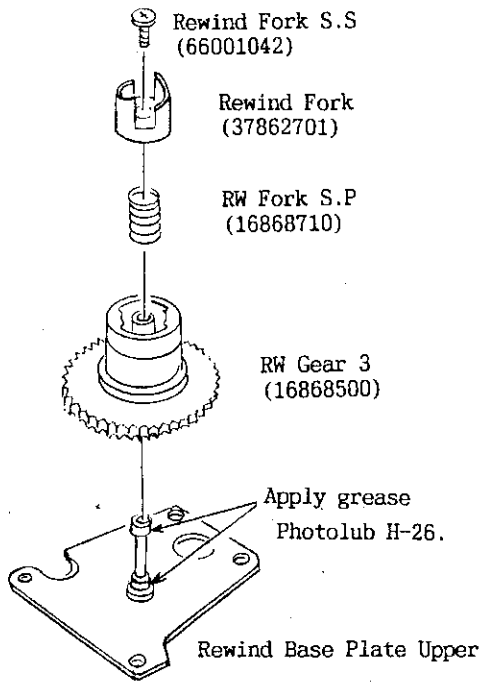


Fig.73

C-1-4 Clutch Gear Ass'y

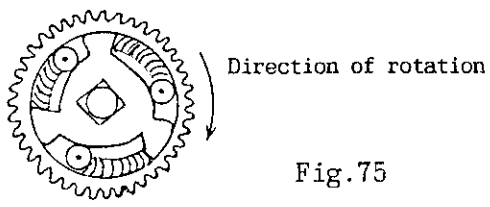
1) Install the Clutch (16869400), Clutch Rollers (13733900) X 3 and Roller Springs (13734010) X 3 on the Clutch Gear.

2) Install the Roller Holder Plate (13734100), Clutch Gear C (16862911) and Clutch Washer (60301810) on the Clutch Gear, and secure them with the Ring (66101225).

Notes: a) **Apply the dispersion arresting liquid on the inside of the Clutch Gear.**
b) **Do not lubricate oil inside the Clutch Gear.**

[Check Method]

Be sure to turn the Clutch Gear C in the direction of the arrow, and never in the other direction.



(Top View of Clutch Gear)

Fig.75

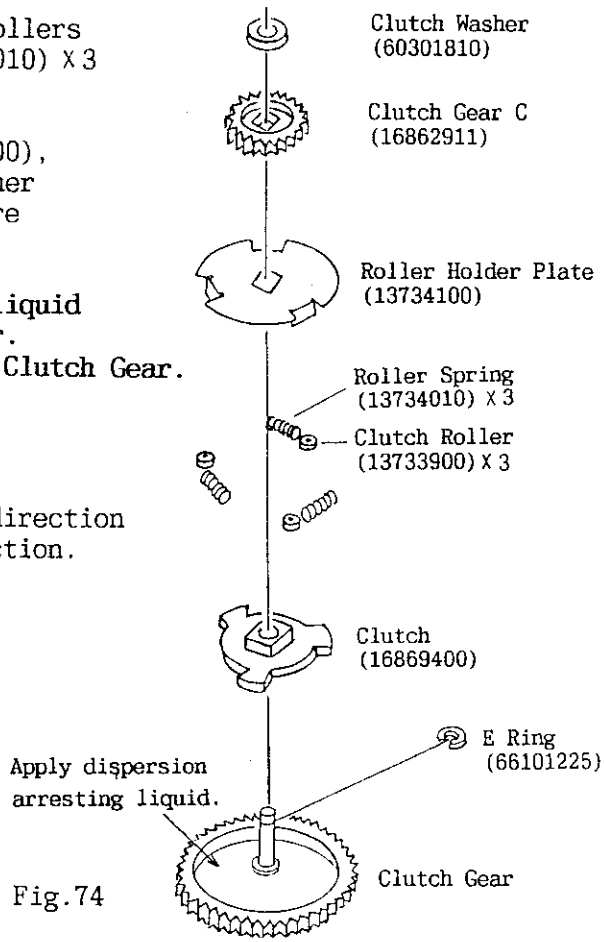


Fig.74

C-1-5 AF Driving Base Plate Ass'y

1) Insert the AF Driving Motor (16977200) in the AF Driving Base Plate (A) (1AD76900), and tighten the AF Driving Motor Setscrews (63902026) X 2 .

2) Apply Three-Bond 1401 to the heads of the AF Driving Motor Setscrews.

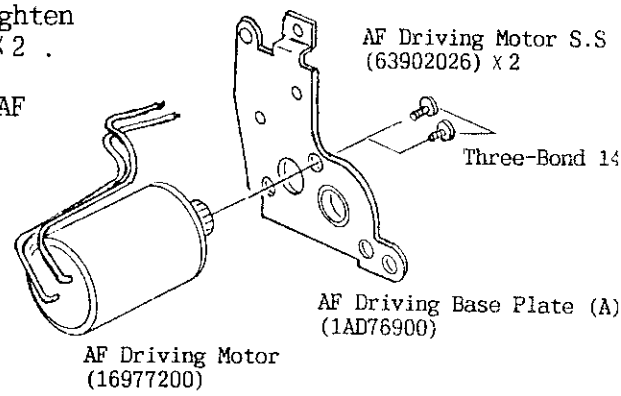


Fig.76

3) Install the AF G2 P3 (16875610), AF G3 Ass'y (168A4600), AF G4 P2 Ass'y (168A4500) and AF P4 (16875810) on the AF Driving Base Plate (B) (16877010).

4) Attach the AF Driving Base Plate (A) W/AF Driving Motor, and tighten the AF Driving Base Plate (A) Setscrews (69213076) X 2 .

5) Fix the AF P1-FPC Ass'y (1AD50700) to the AF Driving Base Plate (B) with the glue (Cemedine 551).

6) Install the AF P4 Friction (16876500), and tighten the AF Photointerrupter Setscrew (61901526).

7) Turn the end of the AF G3 Ass'y with the fingers, and check if it moves smoothly.

8) Run the AF Driving Motor and check the current value. (85mA or below at constant voltage of 5V)

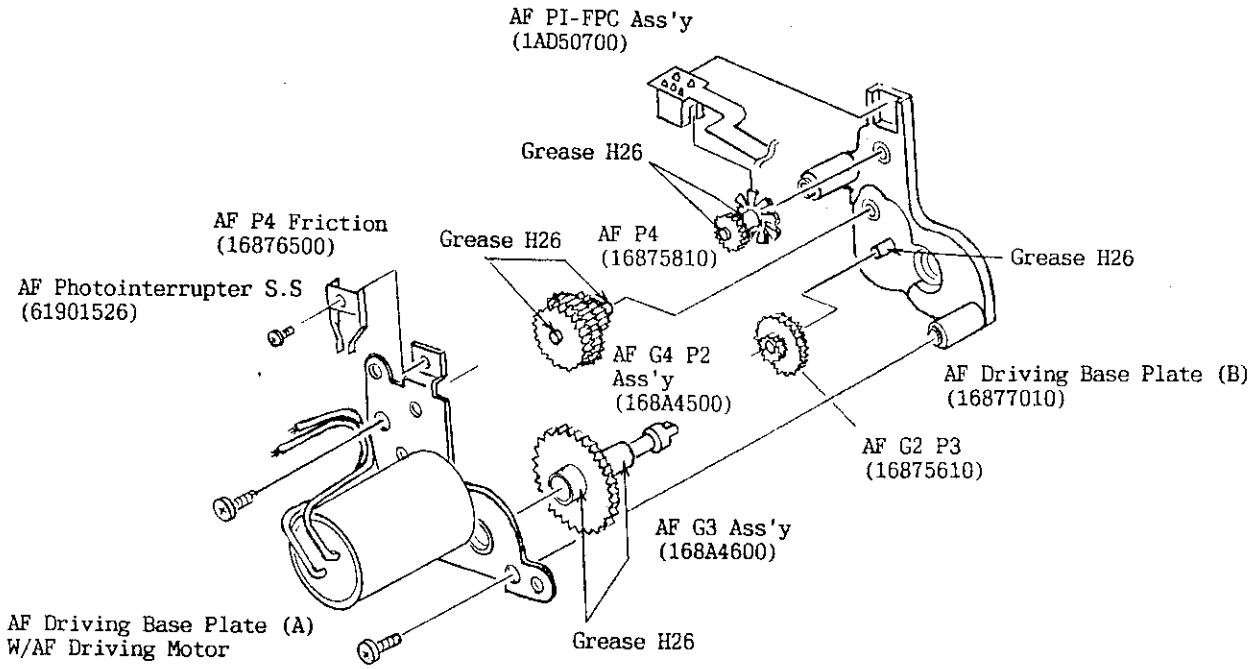


Fig.77

C-1-6 Installation of FC Driving Gear

1)Drive in the FC Driving Gear Shaft (16882410).

2)Place the FC Driving Spring (16882500) and FC Driving Gear (16882300), and fix them with the E Ring (66101225).

3)Hook the end of the FC Driving Spring to the FC Driving Gear.

4)Hook the end of the FC Driving Spring to the Mirror Box and fix it with glue (C-551). (See Fig.78)

5)Turn the FC Driving Gear 2.5 revolutions clockwise (Fig.78), and install the FC Lever (16882110) in the minimum aperture position (Fig.79).

6)Install the FC Lever Retainer (16882600), and tighten the FC Lever Retainer Setscrews (61912226) X2 .

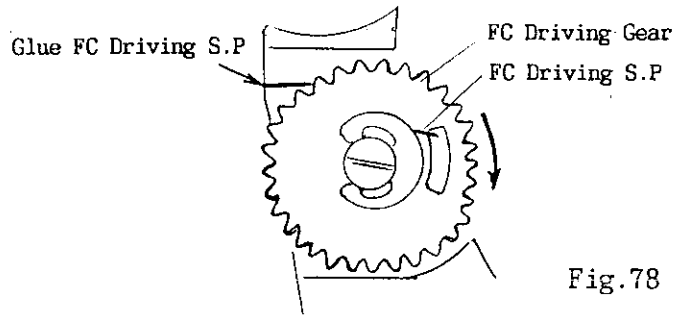


Fig.78

Fig.79

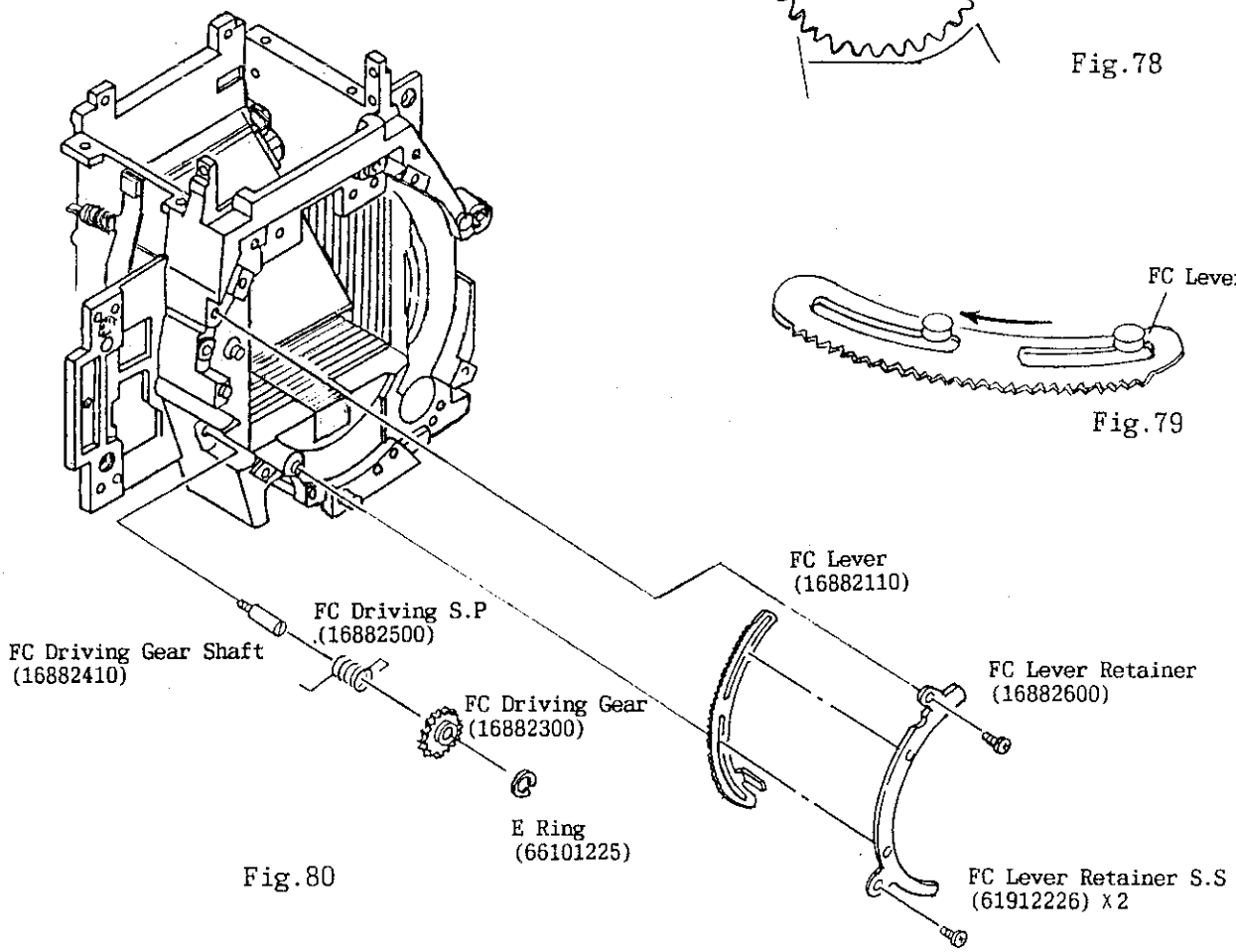


Fig.80

C-1-7 FC Base Plate Ass'y

1)Unlock the FC Gear (3) and the FC Pawl by moving the Mg Charge Lever in the direction of the arrow Ⓐ.

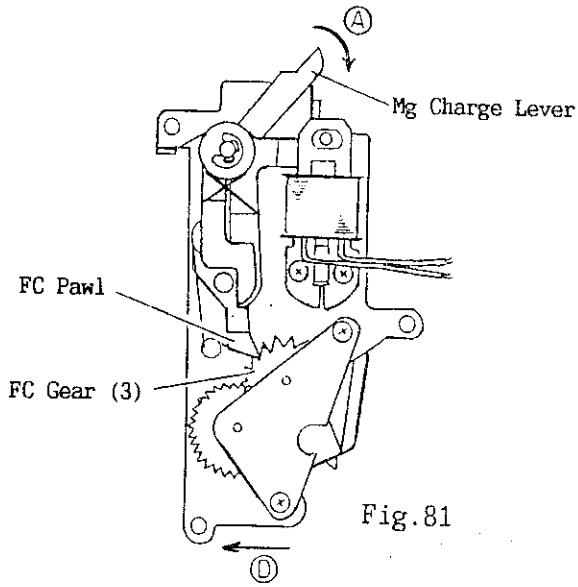


Fig.81

2)Turn the FC Gear (1) in the direction of the arrow Ⓑ (about one turn). Separate the FC Gear (1) and check if the FC Gear (1) turns smoothly.

3)Turn the FC Gear (1) 90° (1/4 turn) in the direction of the arrow Ⓑ from the initial (stopped) position, and then lock the FC Gear (3) with the FC Pawl.

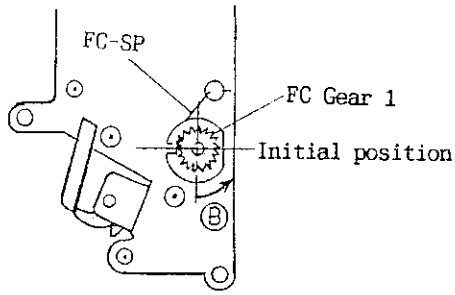


Fig.82

4)Move the FC Lever to the open position (in the direction of the arrow Ⓒ), and install the FC Base Plate Ass'y (168A5600) on the Mirror Box. (See Fig.83) Move the FC Base Plate Ass'y in the direction of the arrow Ⓓ (Fig.81) and tighten the FC Base Plate Setscrews (61912226) X3 .

5)Move the Mg Charge Lever in the direction of the arrow Ⓐ to set the FC Lever free.

6)Move the FC Lever to the open position, release your hold of it, and check if the FC Lever operates smoothly under the force of the FC Spring.

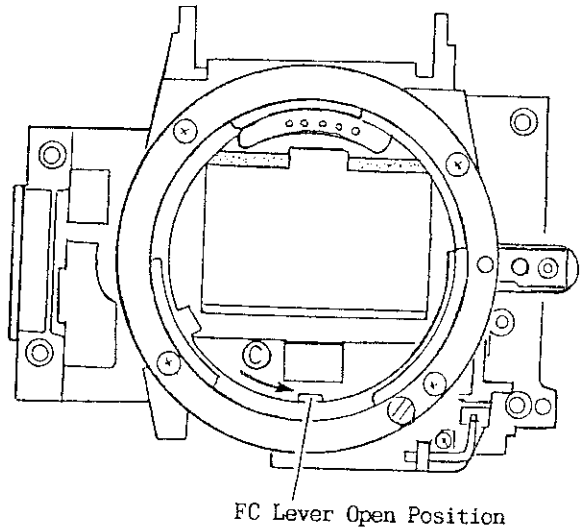


Fig.83

C-2 Reassembly of Parts on Camera Body

C-2-1 Reassemly of Winding Base Plate Upper Ass'y

1)Fit the P SW Ring (16867400) on the Sprocket (16865510), and place them in alignment with the sprocket hole in the body.

2)Pass the Motor Lead Wires through the hole in the Winding Base Plate Upper Ass'y (1ADAA400).

3)Fit the Sprocket Gear Shaft to the hole of the Sprocket, and introduce the Winding Base Plate Ass'y while taking the Motor Lead Wires out. Then set the Winding Base Plate Ass'y in place completely while turning the Spool.

4)Tighten the Winding Base Plate Upper Ass'y Setscrews (69113076) X 2.

Notes:

a) Do not attach the P SW Ring upside down.
b) Install the Winding Bsae Plate Upper Ass'y with the end of the Friction Spring adjusted to the notch of the Spool.
c) After installation of the Winding Base Plate Upper Ass'y, check to see if there is vertical play of the Spool.
d) The spool friction torque be 180g～250g.

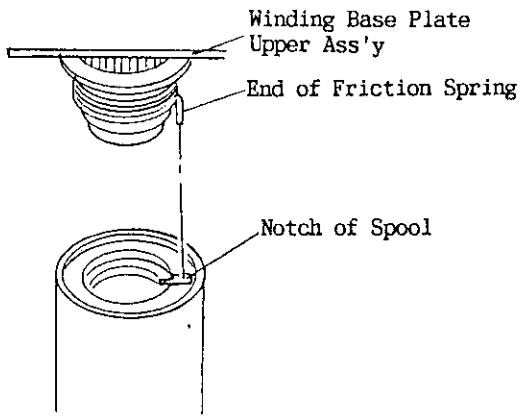


Fig.85

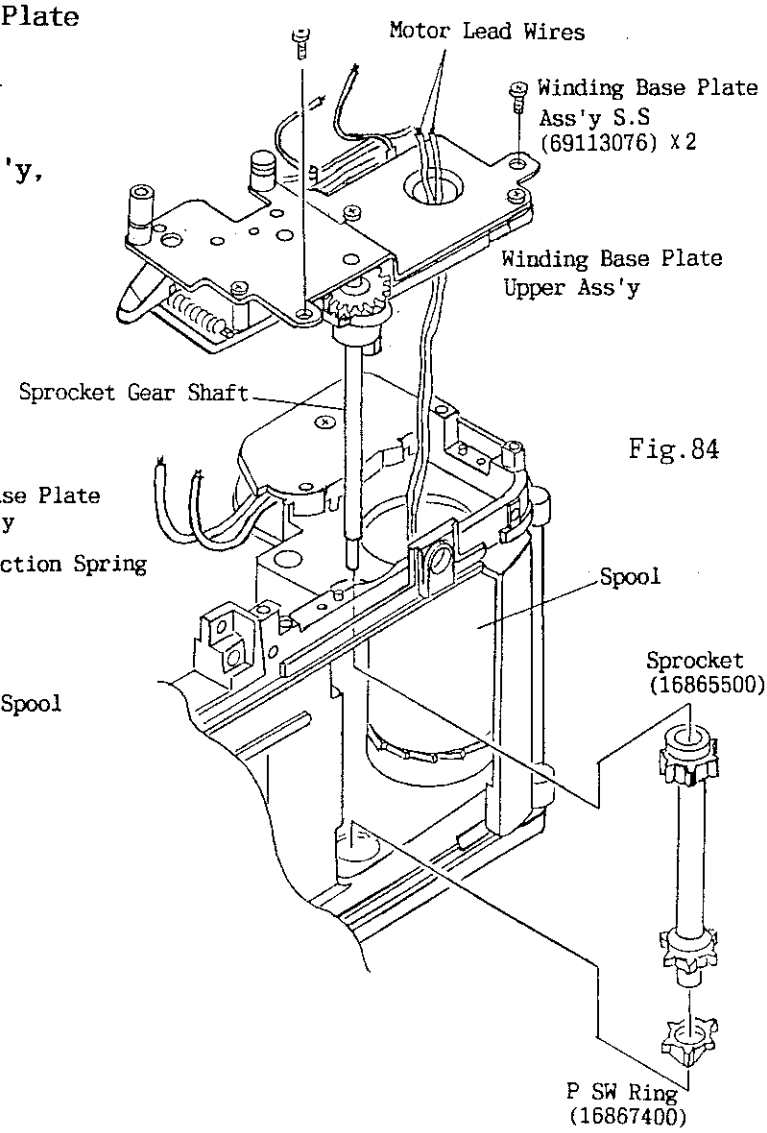


Fig.84

C-2-2 Reassembly of Mirror Box Ass'y

1)Release the Shutter Charge Pin on the side of the Mirror Box. (Fig.87)

2)Make sure that the Sector Gear is in the derection of the arrow in Fig.86.

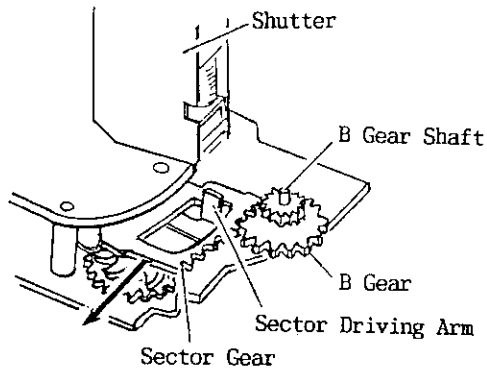
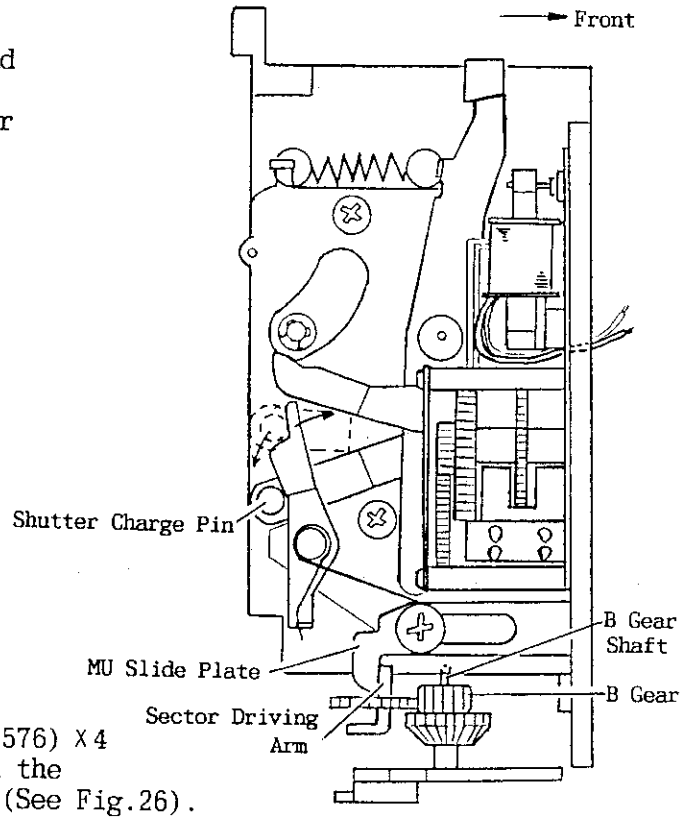


Fig.86

3)Install the Mirror Box Ass'y in such a way that the MU slide Plate is behind the Sector Driving Arm.
At this time, make sure that the B Gear Shaft is the hole of the Mirror Box.

Notes:

a) Make sure that the Spring is properly hooked on the side of the Mirror Box.
b) When installing the Mirror Box Ass'y, make certain that the Red and Black Lead Wires from the AF Motor are out on the right-hand side of the Mirror Box.
c) Be sure not to touch the AF/MF contact when installing the Mirror Box Ass'y.



(Side of Mirror Box)

Fig.87

4)Tighten the Mirror Box Setscrews (69224576) X4 and (63926526) X2 (See Fig.27). Tighten the Winding Base Plate Setscrew (16863300) (See Fig.26).

C-2-3 Reassembly of F. Gear Ass'y

1)Turn the F.Gear 6 revolutions in the derection of the arrow (counterclockwise), align the hole in the F.Gear with the hole in the F.Gear Holder S, and stop the rotation of the F. Gear by inserting a pin (or clip) in the holes. (See Fig.88)

2)Position the Sector Gear on the lower side of the Body in the direction of the arrow Ⓐ . (See Fig.90)

3)Install the F.Gear Holder Ass'y (168A3200) with the FC Lever and FC Ring in the Mirror Box positioned in the direction of the arrow Ⓑ (open position). (See Fig.89)

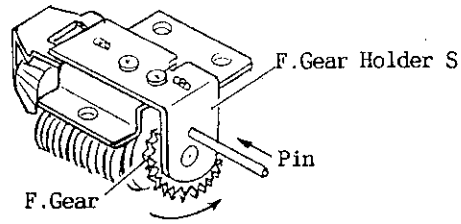
4)Secure the F. Gear Holder Ass'y with the F. Gear Holder Ass'y Setscrews (61812526) X3, and then release your hold of the FC Lever and FC Ring.

5)Pull out the pin having held the F.Gear temporarily, and check the operation of the FC Lever.

6)Loosen the F.Gear Holder Setscrews (61912026) X2 and adjust the operation of the FC Lever and FC Ring. Make sure that they operate without catching from the open position to the aperture stop down position. After this adjustment, apply glue (C-551) to the F. Gear Holder Setscrew.

7)Make certain that there is no play between the FC Ring and the FC Lever. If there is a play of 0.5mm or more between them,repeat the procedure of 2), 3) and 4).

Fig.88



Turn 6 revolutions.

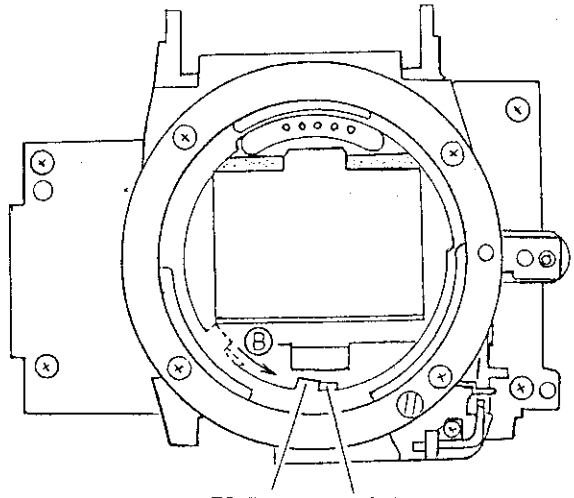


Fig.89

(Open Position)

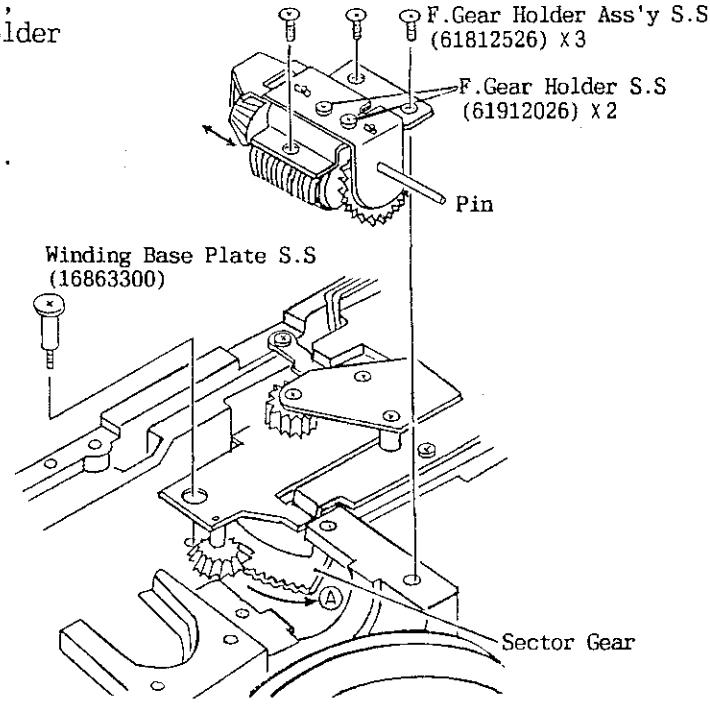


Fig.90

C-3 Forming of FPC and Lead Wires

C-3-1 Forming of Main FPC Ass'y

1)Bend the Main FPC Ass'y with roundness along the chain line (A-A').
At this time, pass the part Ⓒ of the FPC through the hole Ⓓ. (See Fig.92)

2)After the bending of the FPC, solder the parts Ⓐ and Ⓑ. (See Fig.93)

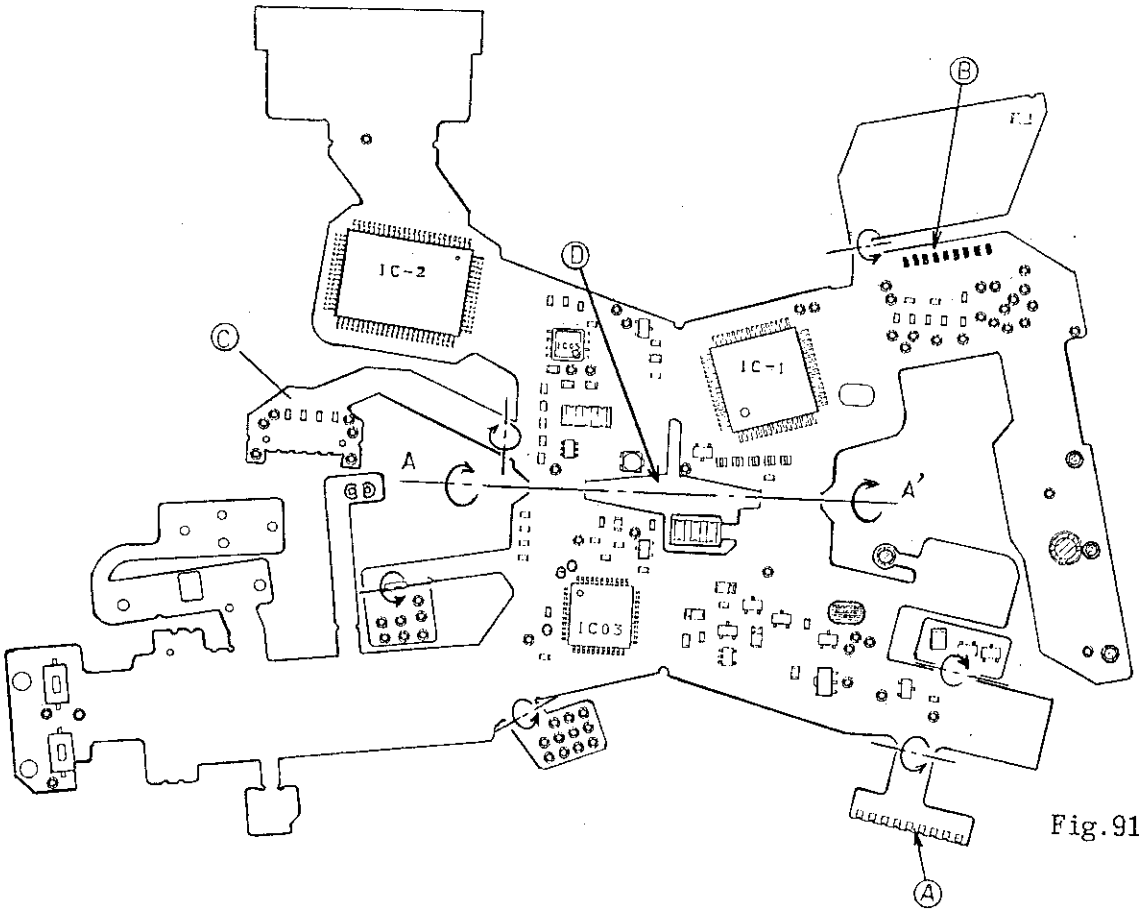


Fig.91

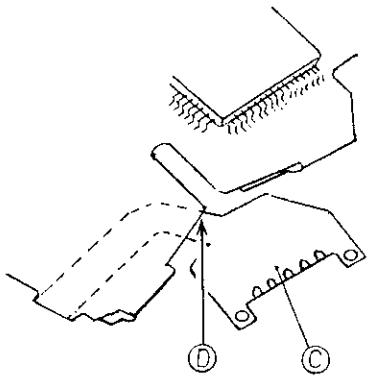


Fig.92

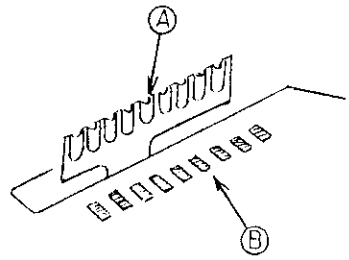


Fig.93

C-3-2 Forming Lead Wires

1)Form the Red and Black Lead Wires (AF-FPC —— Flash Base) for power as shown in Fig.94.

2 Form the Orange and Black (old)/ Gray (new) Lead Wires (Flash FPC —— Flash Base) as shown in Fig.94.

3)Do not from the Orange Lead Wire (AF-FPC —— Flash Base) for V_{DD} on the Mirror Box.

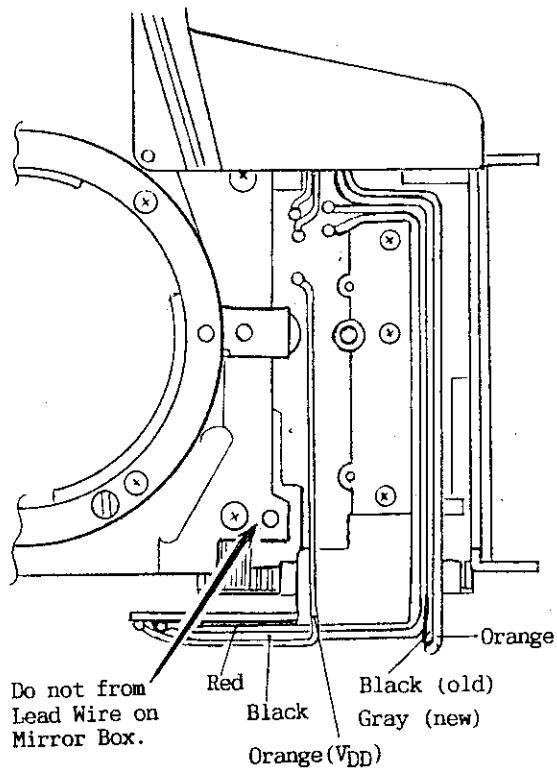
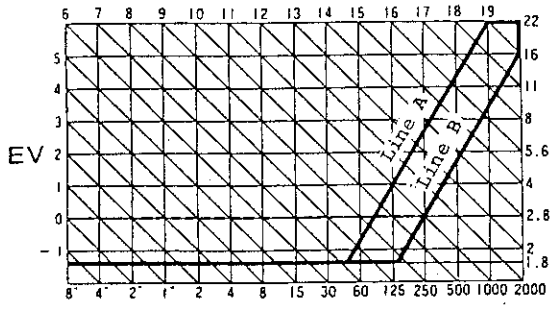


Fig.94

Programmed Automatic control / Program Shift

Program Control Diagram (ISO 100)

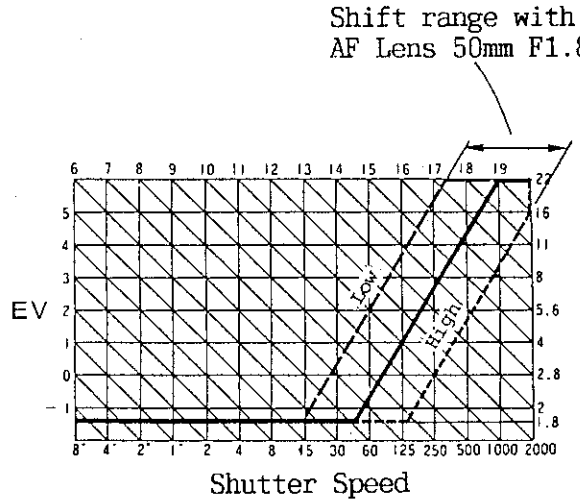


This control diagram shows the control range of shutter speeds and apertures in relation to the EV values in the programmed auto exposure mode.
The lines A and B in the diagram will switch automatically according to the focal length of the lens used, and the camera will select the optimum combination of shutter speed and aperture on the line.

Line A: For lenses with focal lengths of 85mm or shorter.
Line B: For lenses with focal lengths of 86mm or longer.

<Program shift>

Program Shift Diagram (ISO 100)



The exposure program can be shifted to "High" and "Low" (broken oblique lins) within the scope of the same EV value so that you can select your desired shutter speed or aperture depending on the shooting situation.

C-4 Adjustment Procedure

C-4-1 Adjustment of Light Metering Reference Voltage (V_R -V_S)

1)Set the Regulated DC Power Supply to 6V.
Connect the ⊕ and ⊖ terminals of the Regulated DC Power Supply to the ⊕ and ⊖ battery contacts on the camera body.

2)Press the Release Switch halfway. (Power is held for 16 seconds.)

3)Connect the ⊕ terminal of the multimeter to the V_S terminal and the ⊖ terminal to TP 74 (GND).

4)Make sure that the multimeter is indicating 1.2V (V_S voltage).

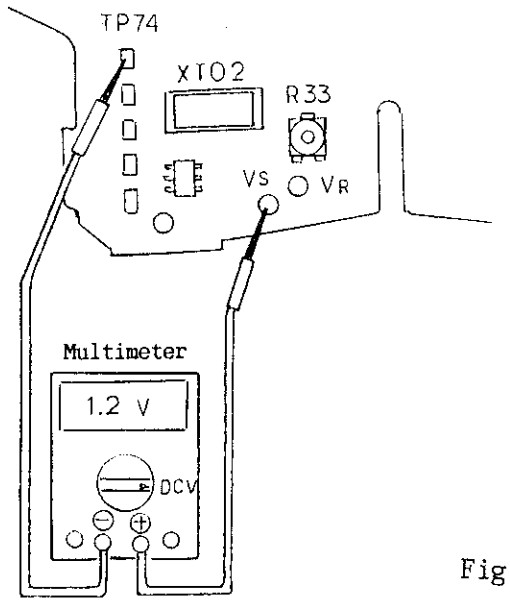


Fig.95

Notes:

a) The above illustration represents the new Main FPC Ass'y.
The old Main FPC Ass'y does not have the V_R and V_S terminal patterns.

b) When the V_S voltage is plus, it should be considered on account of the entry of an undue signal.

c) When the V_S voltage is minus, the FPC's pattern is broken and GND is short-circuited.

5)Connect the ⊕ terminal of the multimeter to the V_R terminal and the ⊖ terminal to the V_S terminal.

6)Adjust by means of R33 (variable resistor) so that the voltage indicated by the multimeter becomes 445mV (at 25°C).

Note:

a) Refer to the correspondence table below in adjusting the reference voltage ($V_R - V_S$), which changes with the ambient temperatures during adjustment.

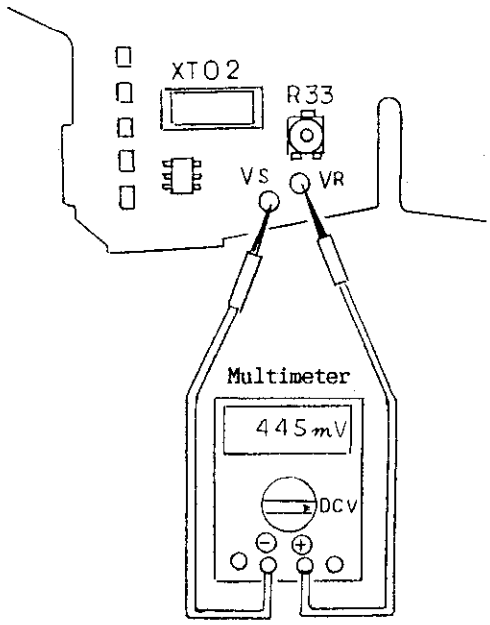


Fig.96

[V_R -Temperature Correspondence Table]

Temp.°C	V_R mV	Temp.°C	V_R mV	Temp.°C	V_R mV	Temp.°C	V_R mV
1	409	11	424	21	439	31	454
2	411	12	426	22	441	32	455
3	412	13	427	23	442	33	457
4	414	14	429	24	444	34	458
5	415	15	430	25	445	35	460
6	417	16	432	26	446	36	461
7	418	17	433	27	448	37	463
8	420	18	435	28	449	38	464
9	421	19	436	29	451	39	466
10	423	20	438	30	452	40	467

C-4-2 Adjustment of Flange Back

○ Distance between the lens mount installation surface and the rail surface on the pressure plate side:

$45.43 \begin{matrix} +0.02\text{mm} \\ -0.03\text{mm} \end{matrix}$

○ Level difference between the rail surface on the pressure plate side and the rail surface on the film side:

$0.2 \pm 0.02\text{mm}$

[Adjustment]

When the flange back dimension is on the minus side, adjust it by placing a washer on the body mount.
Adjusting washers : 0.05mm (128666), 0.02mm (128667)

C-4-3 Adjustment of Viewfinder Focusing

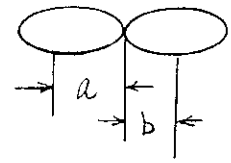
Adjust the focus by replacing the washer under the pentaprism holder.

○ When focusing is not achieved even at ∞ by turning the focus ring of the lens:
⟹ Lower the focus plate position, since the finder back distance is too long.

○ When focusing is achieved before ∞ by turning the focus ring of the lens:
⟹ Raise the focus plate position, since the finder back distance is too short.

Using the ∞ focus position as reference, make adjustments into the ranges as specified at right:

a: 1.0mm
b: 0.25mm



Notes:

a) Do not adjust the viewfinder focusing by moving the 45° angle of Main Mirror.

b) For adjusting washers, see the ASSEMBLING CHART on Page No.2.

C-4-4 Adjustment of AF Auxiliary Light LED Position

Notes:

a) When the AF Auxiliary Light Ass'y (1ADAD900) has been removed from the S-CPU Holder (1AD17300), be sure to adjust the position of the AF Auxiliary Light Ass'y. (See page B-11)

b) Connect the resistance of 100Ω to the plus side of the Regulated DC Power Supply.

c) Perform the adjustment in a dimly-lit room. (LV9 or below)

d) Never allow the AF Auxiliary Light LED to be short-circuited.

[Adjustment]

1)Unsolder the two soldered joints of the Main FPC and the AF Auxiliary Light Ass'y.

2)Loosen the AF Auxiliary Light Ass'y Setscrews (61912026) and (66001023) about 1/4 turn from the tightened position.

3)Attach the Lens 50mm f:18 to the Camera Body.

4)Mount the Camera Body on the tripod.

5)Fix the Camera in a position 1m away from a white wall or paper.

6)Set the voltage on the Regulated DC Power Supply to 5V. Turn off the switch of the Regulated DC Power Supply.

7)Connect the plus power of the Regulated DC Power Supply to the left leg of the AF Auxiliary Light LED and the minus power to the right leg.

8)Turn on the switch of the Regulated DC Power Supply.

9)Looking into the viewfinder, adjust by turning the AF Auxiliary Light Adjusting Shaft (eccentric screw) so that the center of the four vertical lines of the AF Auxiliary Light LED comes to the center of the focus target.

10)Turn off the switch of the constant-voltmeter.

11)Tighten the two AF Auxiliary Light Ass'y Setscrews.

12)Solder the Mian FPC and the AF Auxiliary Light LED.

Note:

a)Never allow the AF Auxiliary Light Ass'y to short-circuit.

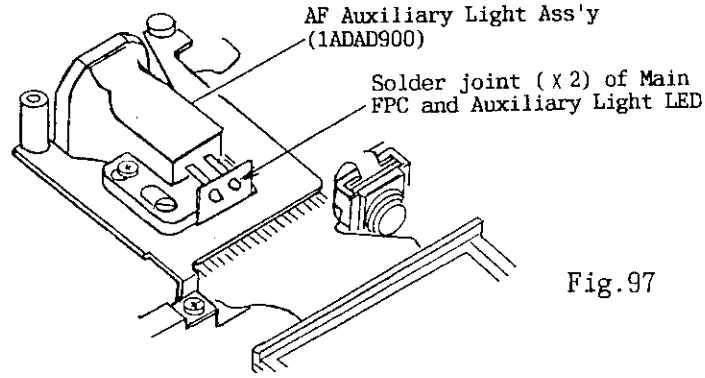


Fig.97

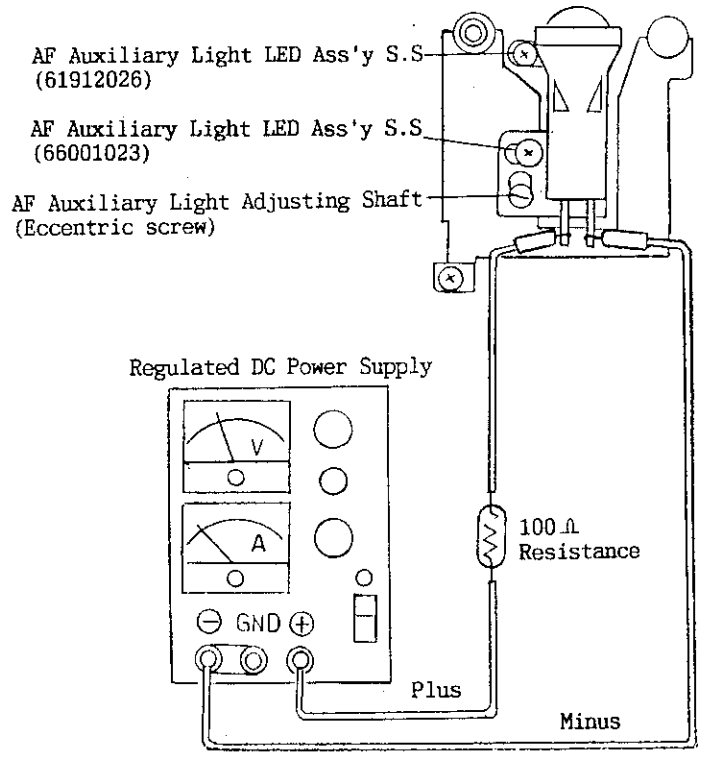


Fig.98

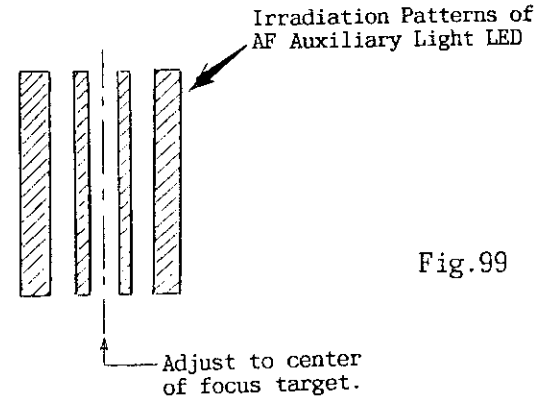


Fig.99

C-4-5 Adjustment of AF Module Position

1) The adjustment of position of the AF Module requires use of a special adjustment setup. Our serviceman therefore should respond to this need by replacing the AF-FPC (S) Ass'y (1ADAS000). In doing so, however, he must make sure that the Main Mirror and Sub Mirror are in right position and the flange back dimension is correct.

2) After replacement of the AF-FPC (S) Ass'y, perform the AF adjustment (electrical compensation of distance metering error) of Command No.5. (See page C-26)

3) When a distance metering error has resulted from the AF adjustment of Command No.5, replace the Mirror Box Ass'y (1ADAB000).

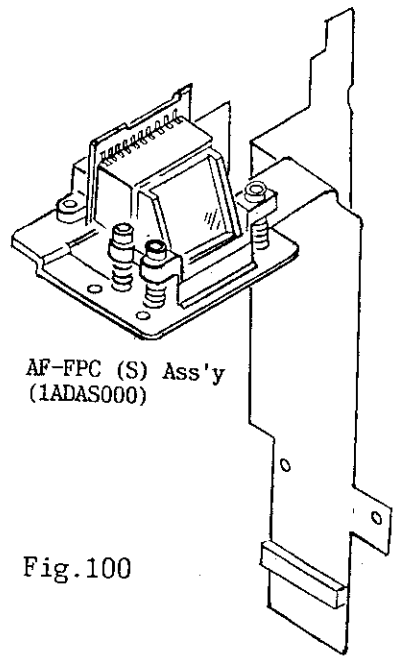


Fig.100

Notes:

a) **Never turn any of the pitch, Yaw and Z Adjusting Screws, for incorrect Pitch, Yaw or Z adjustment of the AF Module cause defective distance measurement.**

b) **Never move the Main Mirror and Sub Mirror, whose mislocation causes defective distance measurement.**

①Pitch---- Optical axis adjustment (Movement adjustment of AF module around X axis)

②Yaw ----- Optical axis adjustment (Movement adjustment of AF module around Y axis)

③Z ------- Adjustment of distance from Body Mount (Adjust whole installation position by shifting in Z axis direction.)

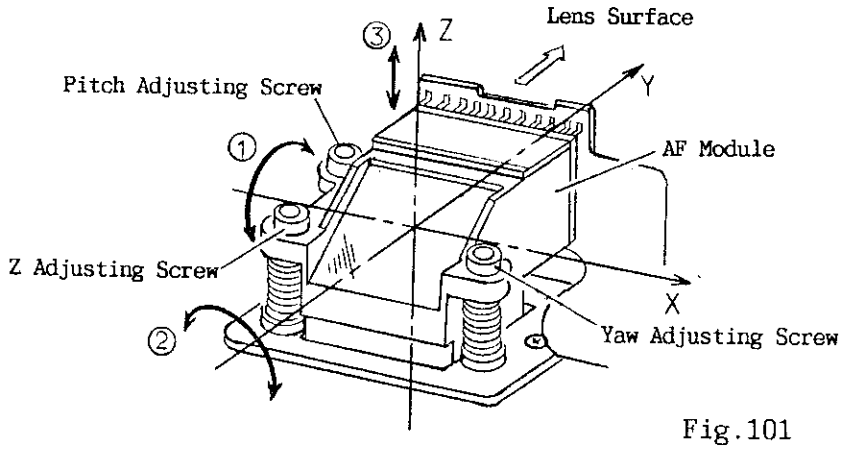


Fig.101

C-4-7 Adjustment of Viewfinder Display

* In adjusting the viewfinder display, align your eye with the center of the eyepiece and make sure that "P" (program mode indicator), "○" (sharp focus mark), "○" (exposure warning mark) and " ↯ " (flash mark) are all displayed perfectly without partial Shading.

1)Loosen the F. Indicator LED Setscrews (69113576) x2.

2)Press the Release Switch halfway.(Power hold: 16 secondes)
Look into the viewfinder, and make the level adjustment of viewfinder display by moving the F. Indicator LED (1AD51700) back and forth.

3)Tighten the F. Indicator LED Setscrews provisionally and make certain that the viewfinder display is set in parallel.
Readjust if it is not parallelled.

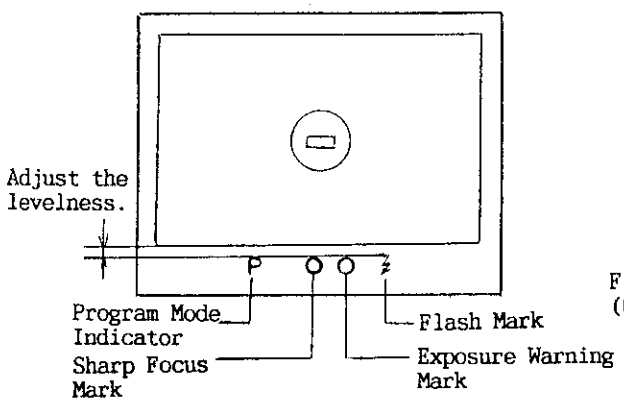


Fig.102

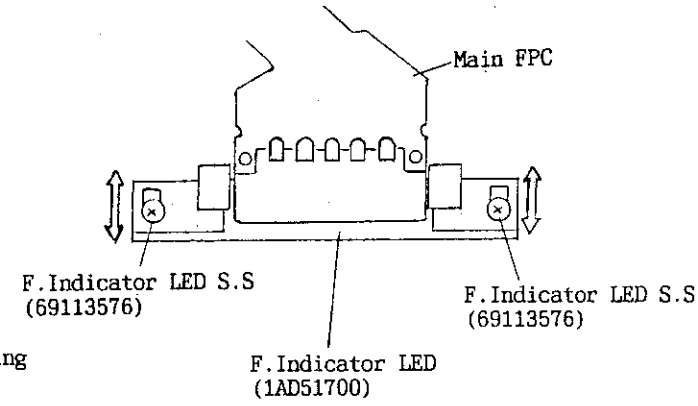


Fig.103

C-4-8 Adjustment of Compensation Values

* This camera, which comes with the functions for manual adjustment of compensation values, does not require any special adjustment tool.

The manual adjusting mode has the following functions:

- Display of currently stored adjusted value
- Change of adjusted value and storage of changed adjusted value
- Display of distance-metering value at current lens position
- Display of operation error code
- Display of light-metering value

1.Setting of Adjusting Mode and Return to Normal Mode

The manual adjusting mode can be set by the following procedure:

① Open the Back Cover, take out the Cartridge Holder Spring Setscrew (69115579) in the Cartridge Chamber and remove the Cartridge Holder Spring (16810612).
With the Cartridge Holder Spring removed, you will find four test points.

② Connect the second test point from bottom to GND (Connect the end of the connector to the test point and the alligator clip to the accessory shoe.)
Keep the other test points open.

③ Turn on the Main Switch, then the test mode will be set and the LCD Panel will switch to the test mode display.

④ Disconnect from GND (See ② above) to make a return to the normal mode.

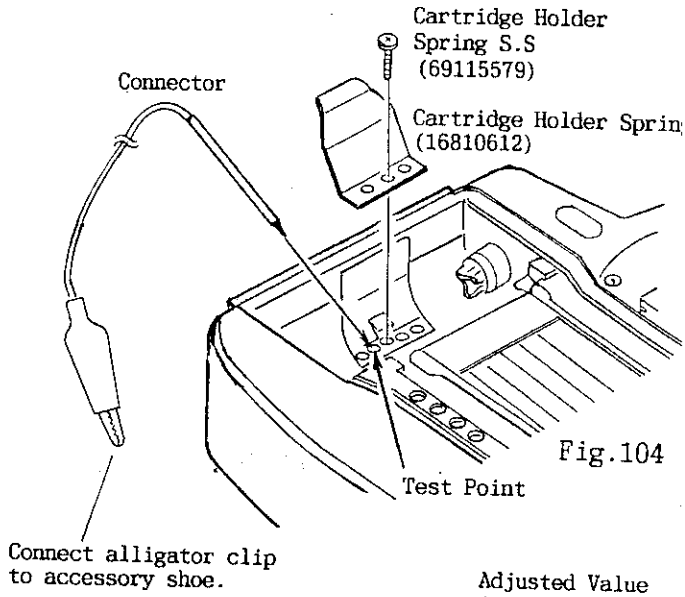


Fig.104

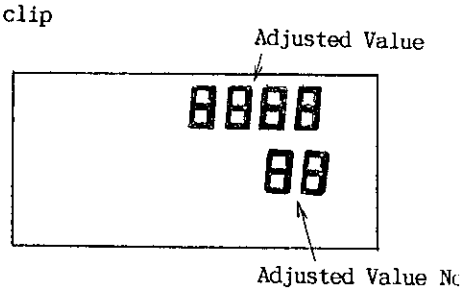


Fig.105

- Upper value shows current adjusted value.
- Lower value shows kind (command No.) of adjusted value

2.Display of Adjusted value

To change the kind of adjusted value, press the "UP" or "DOWN" button while pressing the Drive Button in the test mode.

CW : Up (Adjusted value No.goes up)

CCW: Down (Adjusted value No.goes down)

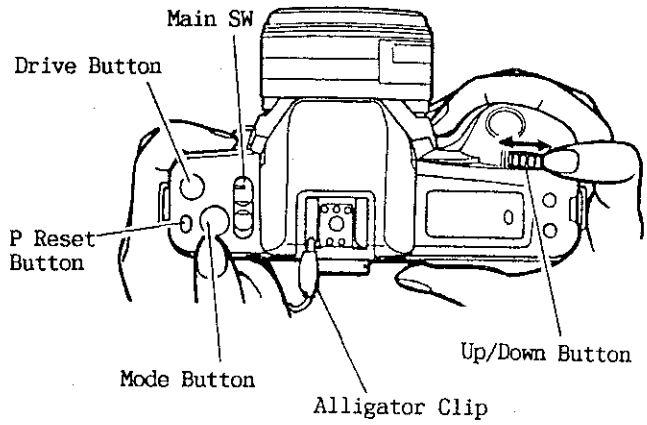


Fig.106

Adjusted value No.	Kind of adjusted value
0	
1	Shutter adjusted value
2	Aperture pulse adjusted value
3	Spot metering adjusted value
4	Average light-metering adjusted value
5	AF adjusted value
6	Battery adjusted value 1 (Warning)
7	Battery adjusted value 2 (Operation inhibit)
8	Reserved
9	Error code display
10	Reserved
11	Flash recharge adjusted value

3.Changer of Adjusted value

Press the Up/ Down Button only without pressing the Drive Button, then the adjusted value will change. The adjusted value, however, will not change at No.8, 9 and 10. The plus/ minus of the adjusted value is represented by the bars for compensation value display on the LCD panel. The compensation display bars light up on the plus side when the adjusted value is a plus value, and on the minus side when it is a minus value.

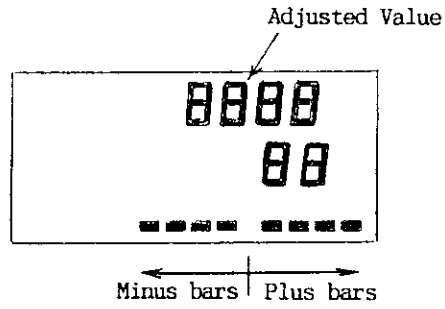


Fig.107

4.Storage of Adjusted Value (Writing into EEPROM)

Set the adjusted value No. to "0" by operating the Up/ Down Button while pressing the Drive Button.
Press the Mode Button without touching the Drive Button, then the whole display of the LCD Panel will flashes twice. After this, storage of the adjusted values is complete.

Note:

a) If you make a return from the test mode to the normal mode without the above operation, the changed data will be rendered invalid.

5.Adjustment Procedures

[1] Adjustment of shutter speed

* This procedure is to be used to adjust high shutter speed (1/ 2000).
* Set adjusted value No.1 and make adjustment so that the shutter speed enters in the following allowable range of manual exposure time:

Allowable Ranges of Manual Exposure Time

Speed	Allowable range			Tolerance
	+	Reference val.	−	STEP
8	9849	8000	6498	± 0.3
4	4924	4000	3249	± 0.3
2	2462	2000	1624	± 0.3
1	1231	1000	812	± 0.3
1/2	615	500	406	± 0.3
1/4	307	250	203	± 0.3
1/8	153	125	101	± 0.3
1/15	76.50	62.50	50.70	± 0.3
1/30	38.47	31.25	25.38	± 0.3
1/60	19.23	15.63	12.69	± 0.3
1/90	13.67	11.11	9.02	± 0.3
1/125	9.61	7.81	6.34	± 0.3
1/250	4.80	3.91	3.17	± 0.3
1/500	2.40	1.95	1.58	± 0.3
1/1000	1.28	0.98	0.74	± 0.4
1/2000	0.74	0.49	0.32	± 0.6

(millisenconds)

Variation in exposure time:

1/2000 0.45EV
1/1000 0.30EV

[Curtain travel speed]

* Be sure to check the curtain travel speed before sdjustment of the shutter speed.
  Use high shutter speed (1/2000) in checking the curtain travel speed.

Curtain travel speed

Curtain	1/2000
First curtain	About 7.8 ms
Second curtain	About 7.8 ms

* Note that the curtain travel speed is already adjusted for the shutters on the camera as well as those as service parts.

[Adjustment]

∘Increase of the adjusted value by 1 results in a shutter speed faster by 0.125 TV.

∘The adjustable range is from -8 (Shutter speed becoms Slower) to +7 (Shutter speed becomes faster)

① In normal mode, measure the shutter speed, using the shutter tester, after setting:

AE mode = MANUAL
Time setting = 1/2000

② Switch to the test mode.

③ Set the adjusted value No.to 1 by pressing the UP/ DOWN button while pressing the Drive button.

④ Change the adjusted value (See 3).

⑤ The adjusted value is stored (See 4).

⑥ Measure the shutter speed again.

⑦ If the shutter speed is outside the allowable range, repeat the procedure ② to ⑤.

[2] Adjustment of aperture pulse

* On completion of shutter speed adjustment of [1] above, perform aperture pulse adjustment.

∘Increase of the adjusted value by 1 results in an aperture size smaller by 0.125AV.

∘The settable range is from 0 to 6.

① In normal mode, measure the exposure error of LV12, using the exposure tester (AE tester),after setting:

Lens = 50/1.8

AE mode = MANUAL

Time setting = 1/125

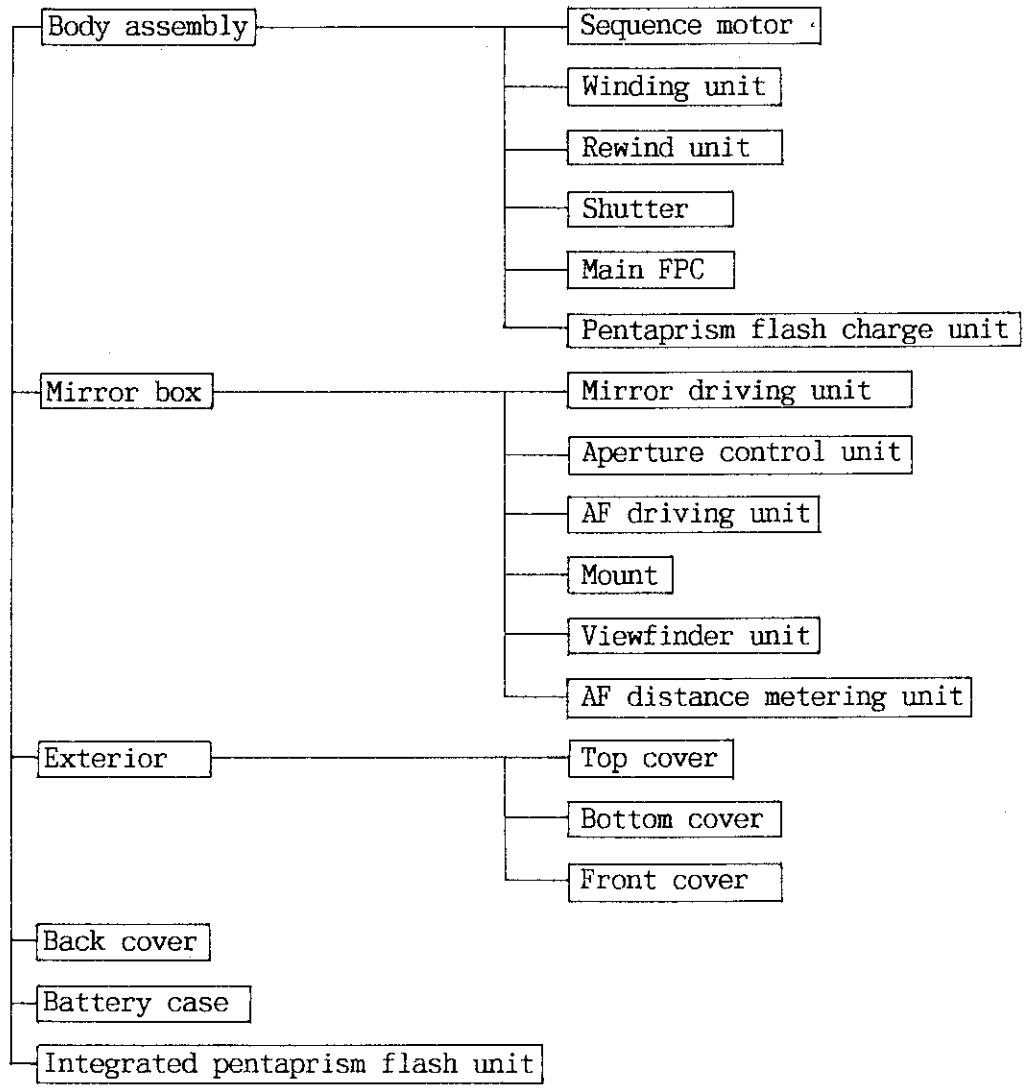
Aperture setting = 5.6

② Switch to the test mode.

INTERNAL STRUCTURE

Many of the mechanical parts are the same as those of 230AF/200AF, and the body assembly is of the same arrangement as 230AF/200AF.
The reduction mechanism connected to the sequence motor is located in the lower left part of the body, the mirror drive and rewind transmission mechanisms in the lower part of the body, and the winding mechanism in the upper left of the body.
The mirror box, aperture control unit, mirror drive unit, AF drive unit and AF circuit are located on the sides and in the lower area, just like they are in 230AF/200AF.
The flash mechanism consists of the flash circuit in the lower part of the body and the flash trigger circuit and pop-up mechanism above the pentaprism.
A newly employed AF auxiliary light assembly is positioned below the outside display in the upper right part of the body.

Mechanical System Diagram



③ Set the adjusted value No. to 2 by pressing the UP/ DOWN button while pressing the Drive button.

④ Change the adjusted value (See 3).

Example:

When the error measured in ① is 0.2EV:
Calculate the adjusted value as follows:

0.2/0.125 = 1.6 (0.125: weight of adjusted value)
≒ 2

The adjusted value obtained above represents the deviation from the current adjusted value.
When the current adjusted value is 0, the adjusted value to be set is 0+2=2.

⑤ The adjusted value is stored (See 4).

[3] Adjustment of average light metering and spot metering

* On completion of aperture pulse adjustment of [2] above, perform adjustment of average light metering and spot metering.

* Set adjusted value No.4 and make adjustment so that the exposure value enters the following range:

Allowable Range of Exposure Value

Brightness (LV)	Allowable range
8	-0.8 +0.8
12	-0.8 +0.8
15	-0.8 +0.8

AE tester----- ISO (ASA) : 100
K value : 1.04
Camera ------- ISO : 100

*When the AE tester does not have K:1.04, set the tester to K:1.3 and adjust the exposure value into the following range:

Allowable Range of Exposure value

Brightness (LV)	Allowable range
8	-1.1 +0.5
12	-1.1 +0.5
15	-1.1 +0.5

AE tester----- ISO (ASA) : 100
K value : 1.3
Camera ------- ISO : 100

[Adjustment]

∘Increase of the adjusted value by 1 results in an exposure value increased by 0.125EV.

∘The settable range is from -16 (exposure value becoms under) to +16 (exposure Value becomes over).

① In normal mode, measure the exposure error of LV6 (or LV5), using the exposure tester (AE tester), after setting:

Lengs = 50/1.8
AE mode = PROGRAM

② Switch to the test mode.

③ Set the adjusted value No. to 4 by pressing the UP/DOWN button while pressing the Drive button.

④ Change the adjusted value (See 3).

Example:

When the error measured in ① is 0.5EV:
Calculate the adjusted value.
0.5/0.125=4
The adjusted value obtained above represents the deviation from the current adjusted value.
When the current adjusted value is -2, the adjusted value to be set is -2+4=2.

⑤ The adjusted value is stored. (See 4)

⑥ Lock the Main Switch once, and turn it on again. Then set the adjusted value No. to 4 by pressing the UP/DOWN button while pressing the Drive button.

⑦ Set the camera to the surface light source (AE tester) of LV12 and press the "P" reset button. While this button is being pressed, the average light-metering value is displayed on the LCD panel (where the adjusted value is displayed).
Make a note of this value.

⑧ In the condition of ⑦, change the adjusted value No. to "3" and press the "P" reset button. While this button is being pressed, the spot metering value displayed. The difference between the average light-metering value obtained in ⑦ and the spot the spot metering value is the adjusted value of spot metering.

⑨ Change the adjusted value of spot metering by the value obtained in ⑧
The light metering value after adjustment is: $A_{VE} = S_{POT}$

⑩ The adjusted value is stored. (See 4)

Note:

a) After storage of the adjusted value, operate the Main Switch "ON"→"LOCK" →"ON" once. Otherwise the camera will operate on the adjusted value prior to the change.

[4] AF adjustment (focus adjustment in Z direction)

- Increase of the adjusted value by 1 results in a focus position moving backward by 7.6 μm.

- The settable range is from -128 to +127.

① Remove the original focus screen and attach the horizontal split/ microprism (FA-4).

② Attach the 50/1.8 lens to the camera.

③ Mount the camera on the tripod and set the tripod in position 2.0m away from the AF chart.

④ Align the center of the viewfinder with the center of the AF chart.

⑤ Perform focusing by turning the focus ring (Manual Focus).

* Focus accurately, using the magni-finder.

⑥ Switch to the test mode.

⑦ Set the adjusted value No. to 5 by pressing the UP/ DOWN button while pressing the Drive button. At this time, the current adjusted value is displayed. Make a note of this value.

⑧ With the adjusted value No. kept at "5", press the "P" reset button, during which the deviation of the AF adjusted value is displayed.

⑨ Shift the current adjusted value obtained in ⑦ by the deviation value obtained in ⑧.

⑩ Change to the value obtained in ⑨ by pressing the UP/DOWN button only.

⑪ The adjusted value is stored. (See 4)

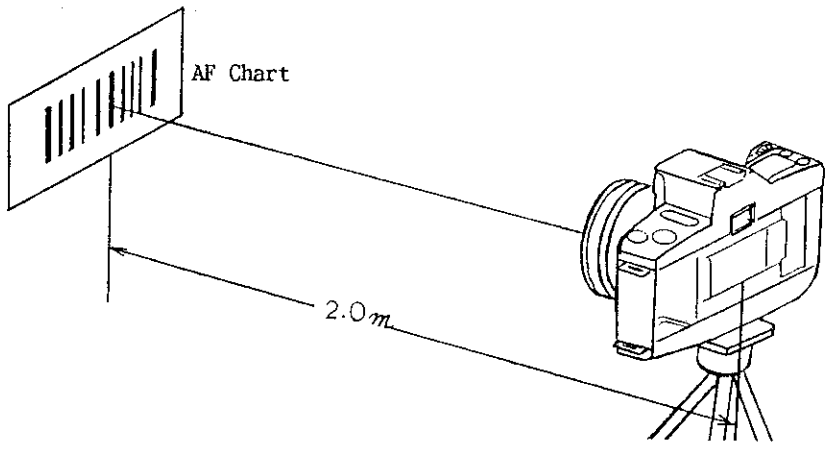


Fig.108

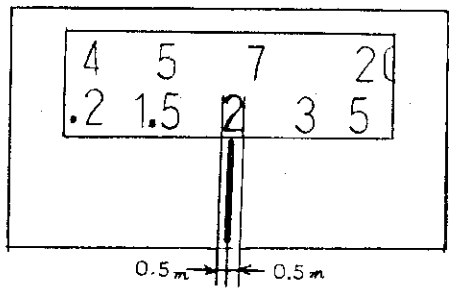
[Confirmation of AF adjustment]

①Turn on the Main Switch.

②Place a hand before the lens, and set the lens in the infinity position by pressing the release button.

③Press the release button halfway and make certain that the lens stops at 2.0m position on focus scale and the sharp focus mark lights up in the viewfinder.

④Repeat the operation of ② and ③ several times. If the lens is within the following allowable range, the AF adjustment is complete. (See Fig. 109)



Lens Indicator

Fig.109

[5] Battery warning adjustment

* There is no need of adjusting the camera as well as service parts, which are already adjusted in the factory.

B1: Adjusted value No.6

B2: Adjusted value No.7

°Increase of the adjusted value by 1 results in a detected voltage higher by 0.03V.

°Settable range is from -128 to +127.

Compensation value

B1 = B2+5
B2 =

* Note that the detected voltage will vary with the change of the adjusted value. Therefore, take care not to change it when conducting other adjustments.

[6] Adjustment of charge voltage

* It is not necessary to adjust the charge voltage sdjusted value, which is a fixed value.

◦Increase of the adjusted value by 1 results in a charge voltage higher by 1.5V.

◦The settable range is from -128 to +127.
Charge voltage adjusted value = 0 (fixed value)

[7] Display of error code

Upon selection of the adjusted value No. 9, an error code will be displayed in the adjusted value display area. The error code shows the kind of abnormality when an operation error has occurred. See page C-30 for the correspondence table of codes and errors.)
The error code is rewritten only when an operation error has taken place.

Note:

The error code can not be changed by operating the UP/DOWN button.

[8] Display of light metering value

Select the adjusted value No. of 3 and press the "P" reset button, during which the average light-metering value is displayed. At release of the "P" reset button, the display will return to the adjusted value of average light metering.

Select the adjusted value No. of 4 and press the "P" reset button, during which the spot metering value is displayed. At release of the "P" reset button, the display will return to the average light metering value.

Brightness-Light-Metering Display Data
(both average and spot meterings)

Brightness [LV]	Display data
0	32
1	24
2	16
3	08
4	00
5	-08
6	-14
7	-22
8	-30
9	-38
10	-46
11	-54
12	-62
13	-70
14	-78
15	-84
16	-92
17	-100
18	-108
19	-116

C-5 Other

C-5-1 X-Contact

1)Delay time ····· X-contact is turned ON during "full open" of shutter, and there is "full open" time of 1ms or more after it.

2)Contact efficiency····· 60% or above for specified time of 1ms

3)X time·····1/90 sec ±0.3EV (9.02 msec ~ 13.67 msec)

C-5-2 Current Consumption

1)Stand-by current	5 μA or below (Check at constant voltage of 6.0V.)
2)Main switch ON	150 mA or below
3)Winding operation	800 mA or below
4)Automatic stop	1350 mA or below
5)Rewinding operation	800 mA or below

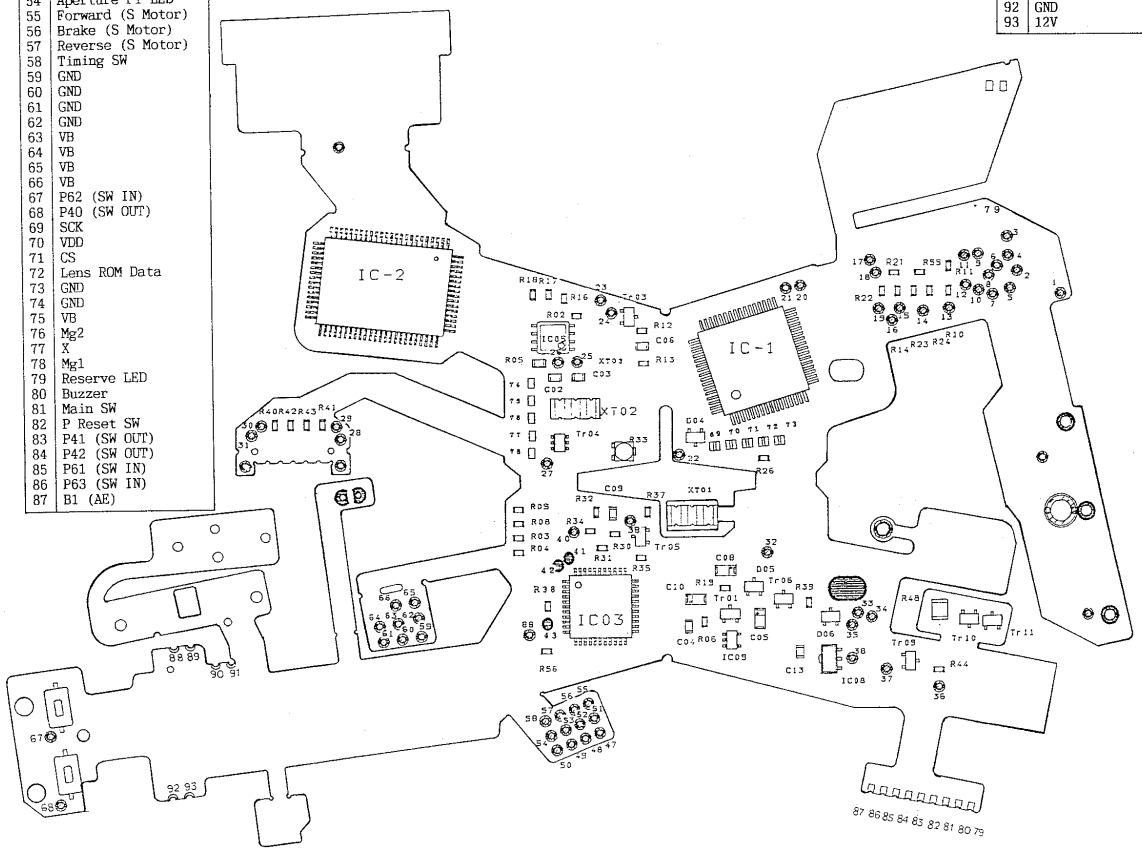
Mechanical Operation Error Code Table

HEX	DEC	Error	
20	32	No error	
21	33		05 Winding complete with film
22	34	(Winding perforation error)	06 Winding complete without film
23	35	(Winding timing SW error)	07 Film end
24	36	Mirror-up error	
25	37	Aperture data error	
26	38	Aperture control error	
27	39	Mechanical initialization error	
28	40		
29	41		09 Initial film advance complete with film
2A	42	(Initial film advance Winding perforation error)	0A Initial film advance complete without film
2B	43	(Initial film advance Winding timing SW error)	0B Film end
2C	44	Initial film advance Mirror-up error	
2D	45		
2E	46	Rewinding error	
2F	47		

HEX	DEC	Error	Adjustment
30	48	B2 error Initial battery check	01 Shutter
31	49		02 Aperture pulse
32	50		03 AE exposure value AVE
33	51	B2 error Winding	04 AE exposure value SPOT
34	52	B2 error Mirror-up	05 AF
35	53	B2 error Rewinding	06 Battery check B1
36	54		07 Battery check B2
37	55	B2 error Mechanical initialization	08 Light metering change
38	56		09 Error code display
39	57		10
3A	58		11 Flash charge
3B	59	B2 error Initial film advance Winding	
3C	60	B2 error Initial film advance Mirror-up	
3D	61	B2 error Flash	
3E	62		
3F	63	B3 error (No-load battery check)	

ELECTRIC PARTS ON MAIN FPC AND TEST POINTS

No	Test Point
51	Aperture Mg Control
52	Perforation SW
53	Aux. Light (Self)
54	Aperture PI LED
55	Forward (S Motor)
56	Brake (S Motor)
57	Reverse (S Motor)
58	Timing SW
59	GND
60	GND
61	GND
62	GND
63	VB
64	VB
65	VB
66	VB
67	P62 (SW IN)
68	P40 (SW OUT)
69	SCK
70	VDD
71	CS
72	Lens ROM Data
73	GND
74	GND
75	VB
76	Mg2
77	X
78	Mg1
79	Reserve LED
80	Buzzer
81	Main SW
82	P Reset SW
83	P41 (SW OUT)
84	P42 (SW OUT)
85	P61 (SW IN)
86	P63 (SW IN)
87	B1 (AE)



Soldered joints of Main FPC and DC-DC Converter

88	VO1(5.6V)
89	P.H
90	GND
91	VB(6.0V)
92	GND
93	12V

Main FPC Test Points

No	Test Point
1	GND
2	DX2
3	GND
4	DX3
5	DX1
6	DX4
7	SDI (S)
8	DXO
9	NC
10	SCK
11	Back Cover SW
12	SDO (S)
13	TEST Terminal
14	Imprint
15	ISO(Data Back)
16	REQSM
17	Pop Up SW
18	SCB
19	AF/MF SW
20	REQMS
21	ACK
22	IN1 (AF Motor)
23	CS
24	PH (BCC)
25	32K Oscillation
26	32K Oscillation
27	NC
28	● Red (LED) Warning
29	Red (LED) Flash
30	P Green (LED) PROG
31	○ Green (LED) Focus
32	VDD
33	AVref
34	AF/PI Pulse
35	AF/MF SW
36	AF/PI LED
37	IN2 (AF Motor)
38	VCC
39	Vs
40	VR
41	SPD2 (AVE)
42	SPD1 (SPOT)
43	SPD (Cathode)
44	-
45	-
46	-
47	Aperture PI Pulse
48	Battery Cover SW
49	REW SW
50	REL SW

CONNECTION DIAGRAM OF MAIN FPC

Connection (Table) of Main FPC / Counter LCD

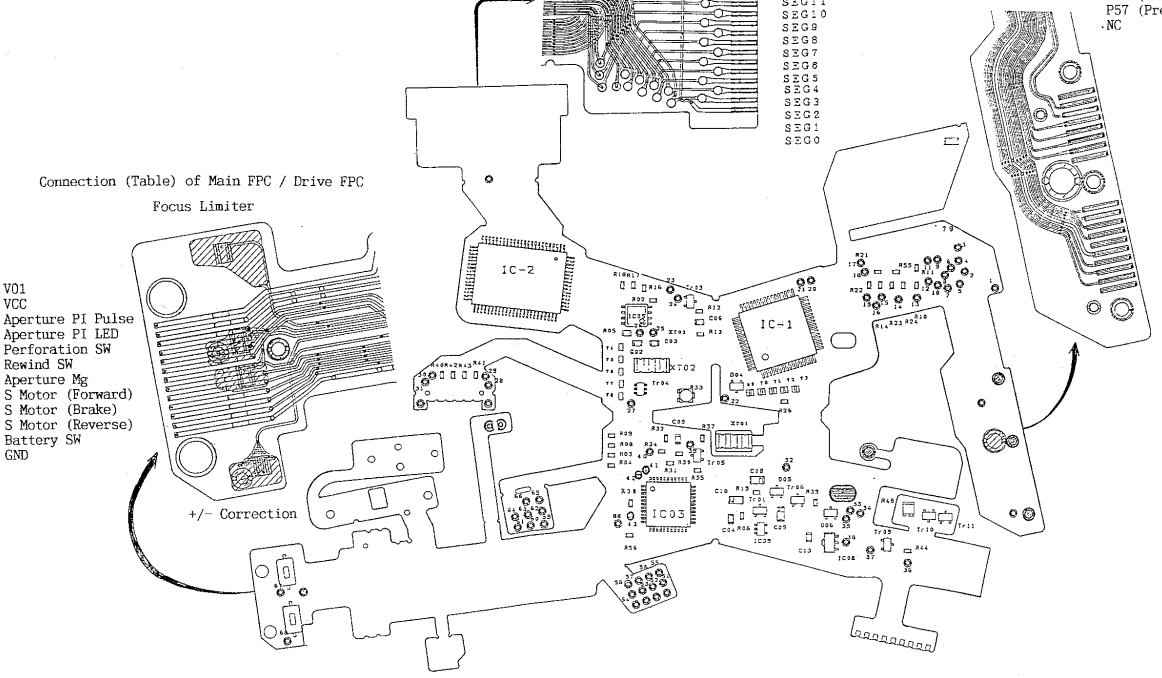
	COM2
	COM1
	COM0
	SEG29
	SEG28
	SEG27
	SEG26
	SEG25
	SEG24
	SEG23
	SEG23
	SEG22
	SEG21
	SEG20
	SEG19
	SEG18
	SEG17
	SEG16
	SEG15
	SEG14
	SEG13
	SEG12
	SEG11
	SEG10
	SEG9
	SEG8
	SEG7
	SEG6
	SEG5
	SEG4
	SEG3
	SEG2
	SEG1
	SEG0

Connection (Table) of Main FPC / Top Cover FPC/DX-FPC

NC	NC
Pop-Up SW	DX4
Main SW	DX3
P Reset SW	DX2
P41 (SW OUT2)	NC
P42 (SW OUT3)	DX1
P61 (SW IN1)	DX0
NC	NC
P63 (SW IN3)	NC
B1	ISO
Pre-Flash SW	DATE
AN2	SI (S)
NC	SCK
GND	SO (S)
Release SW	Back Cover SW
P64 (Charge Control)	TEST
P57 (Pre-Flash)	GND
NC	NC

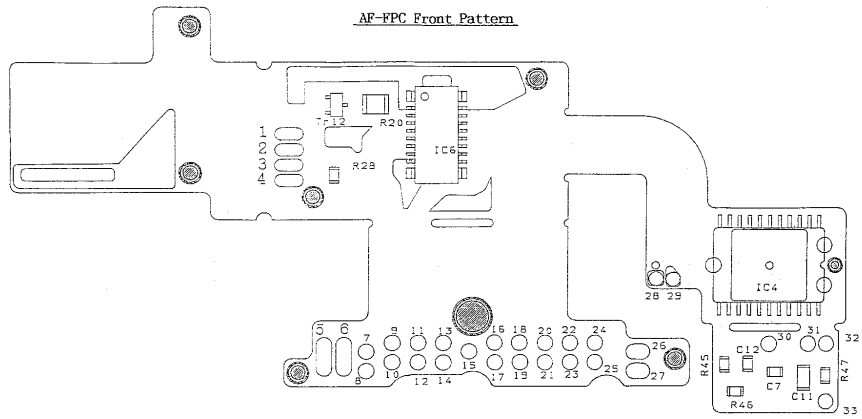
Connection (Table) of Main FPC / Drive FPC

	Focus Limiter
V01	
VCC	
Aperture PI Pulse	
Aperture PI LED	
Perforation SW	
Rewind SW	
Aperture Mg	
S Motor (Forward)	
S Motor (Brake)	
S Motor (Reverse)	
Battery SW	
GND	



ELECTRIC PARTS ON AF-FPC AND TEST POINTS

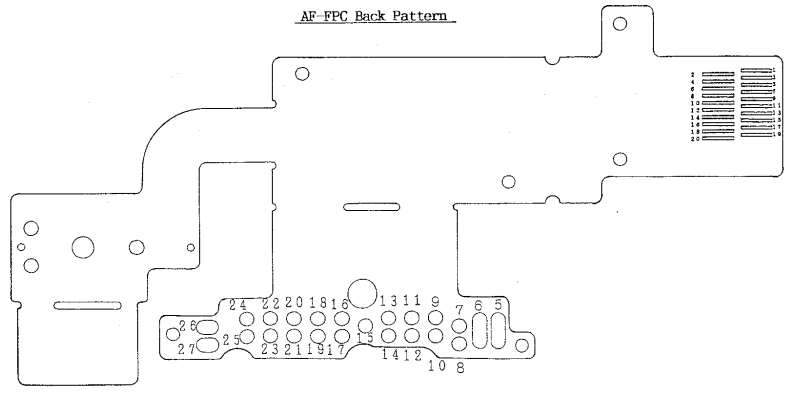
AF-FPC Front Pattern



Test Points

1. AF-LED
2. GND
3. AF-PULS
4. VDD
5. GND
6. VB
7. AF-PULS
8. IN2
9. IN1
10. VOUT
11. VDD
12. GND
13. 250KHz
14. ∅CH
15. ∅AD
16. ∅TR
17. AF-RESET
18. ∅CG.
19. O/M SELLECT
20. AGC2
21. AGC1
22. AGC0
23. ∅TG
24. 12V
25. GND
26. Motor (OUT2)
27. Motor (OUT1)
28. VB
29. Reserve Irradiation LED
30. 12V
31. GND
32. VOS
33. VZD

AF-FPC Back Pattern



Test Points

5. GND
6. VB
7. AF-PULS
8. IN2
9. IN1
10. VOUT
11. VDD
12. GND
13. 250KHz
14. ∅CH
15. ∅AD
16. ∅TR
17. AF-RESET
18. ∅CG
19. O/M SELLECT
20. AGC2
21. AGC1
22. AGC0
23. ∅TG
24. 12V
25. GND
26. Motor (OUT2)
27. Motor (OUT1)

Connector Terminal Table

1. GND
2. VDD
3. 12V
4. Reserve Irradiation LED
5. AF-LED
6. 250KHz
7. VOUT
8. AGC1
9. AGC2
10. O/M SKL
11. IN2
12. IN1
13. AGC0
14. ∅CH
15. AF-PULS
16. ∅AD
17. ∅CG
18. ∅TG
19. AF-RESET
20. ∅TB

SEQUENCE MECHANISM

The mechanism of 270AF (230AF Super) is almost the same as that of 230AF/200AF. The sequence motor in the spool, in combination with the electrical system, controls the mechanisms interlocked for film winding, rewinding, aperture control and mirror drive. (Refer to the release sequence time chart on page A-11.)

(1) Aperture control and mirror up

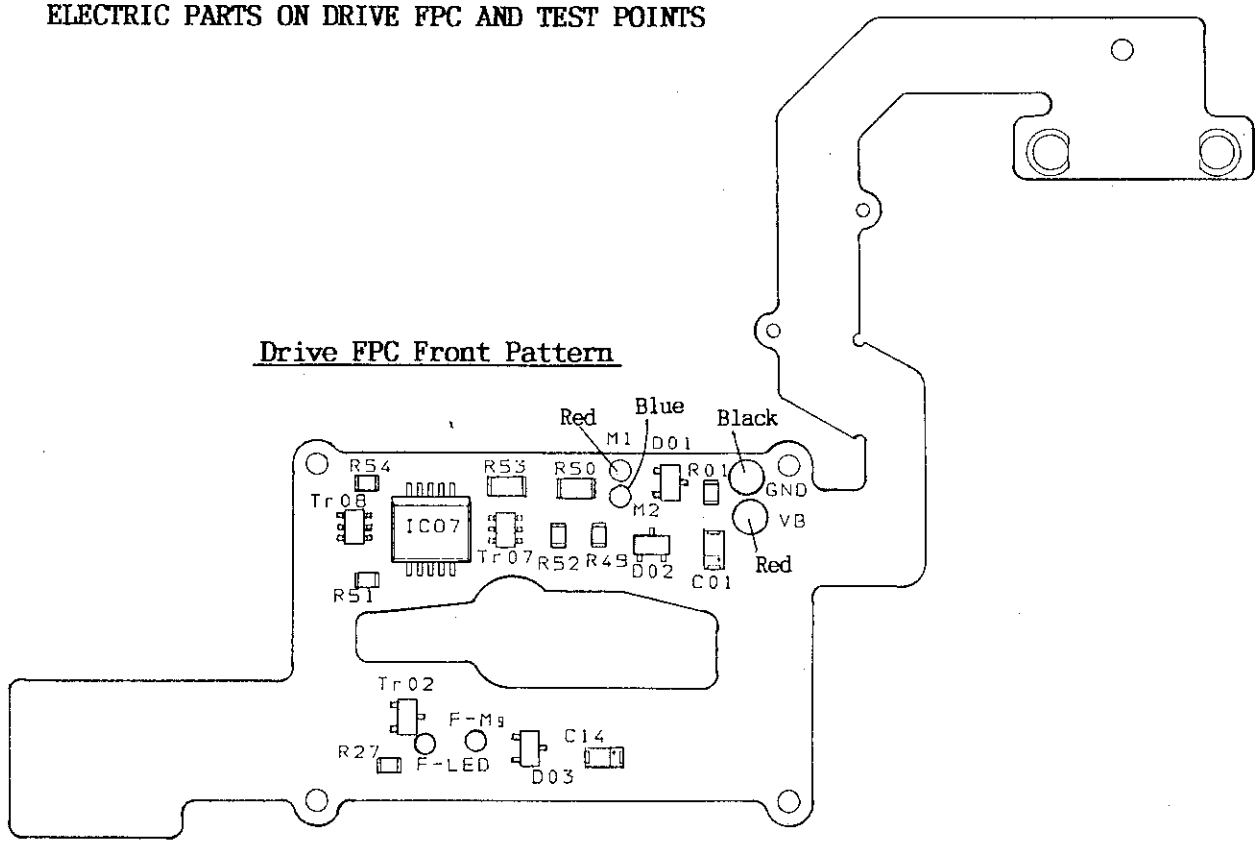
Press of the shutter button turns on the release switch. Then a signal comes out from the CPU and sets off the forward run of the motor, which rotates the reduction gear to rotate the one-way gear (for separation from the film winding side) and the ratchet gear. Then the ratchet arm, the sector drive arm and the MU sliding plate are swung to drive the mirror up. At the same time, the bevel gear is rotated via the gear on the sector driving arm to rotate the aperture ring. The aperture control level turns following the aperture ring. Aperture control is performed by counting the pulses given by the encoder interlocked with the aperture ring. When the predetermined number of pulses is reached, the magnet is energized to stop the aperture ring, determining an aperture stop down value.
Immediately before completion of mirror up and aperture stop down, the shutter lock is released by mechanical interlock so that the shutter curtains are ready for traveling. At the same time, the timing switch is turned on to start the motor, which releases the double winding prevention lever to permit the next winding.
The first curtain of the shutter travels when the first curtain magnet is deenergized upon the passage of a certain time after the turning on of the timing switch. The second curtain closes when the second curtain magnet is deenergized upon the passage of a time required for proper exposure after the first curtain travel. The exposure of the film is completed during these travels of the curtains.

(2) Film winding

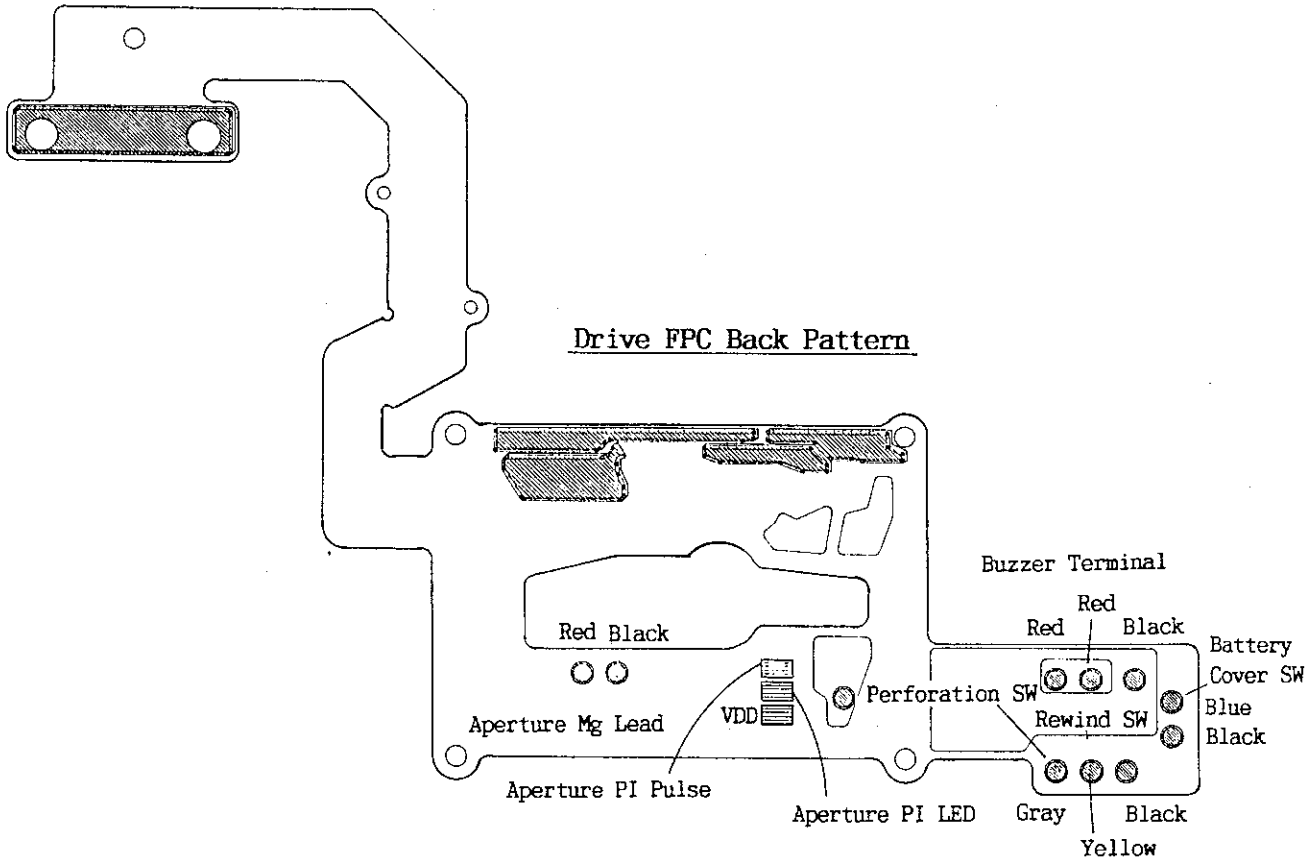
Immediately after completion of shutter operation, the film is automatically wound in preparation for the next shooting.
This time, the motor is reversed to rotate the reduction gears,one-way gear, double winding prevention gear, sprocket and spool.
At the end of motor run equivalent to the advance of one frame of the film, a claw trips in the hook of the double winding prevention gear to stop winding. At this point, the timing switch is turned off to stop the motor. During this operation, shutter charge and aperture magnet charge are performed by the swinging of the charge lever which is caused by the cam coaxial with the double winding prevention gear.

ELECTRIC PARTS ON DRIVE FPC AND TEST POINTS

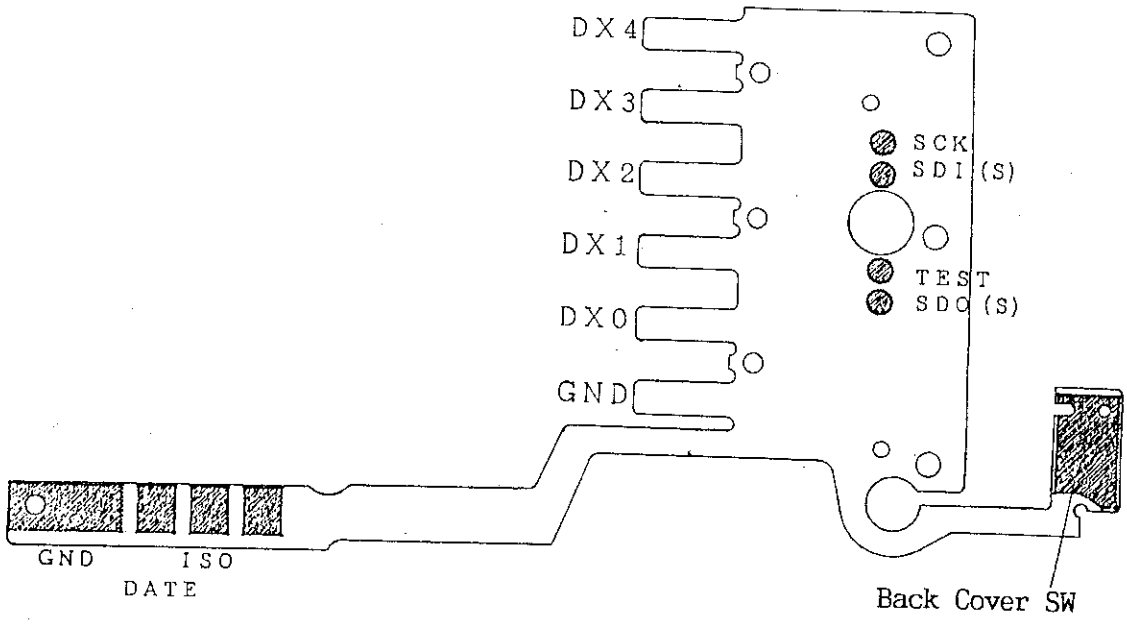
Drive FPC Front Pattern



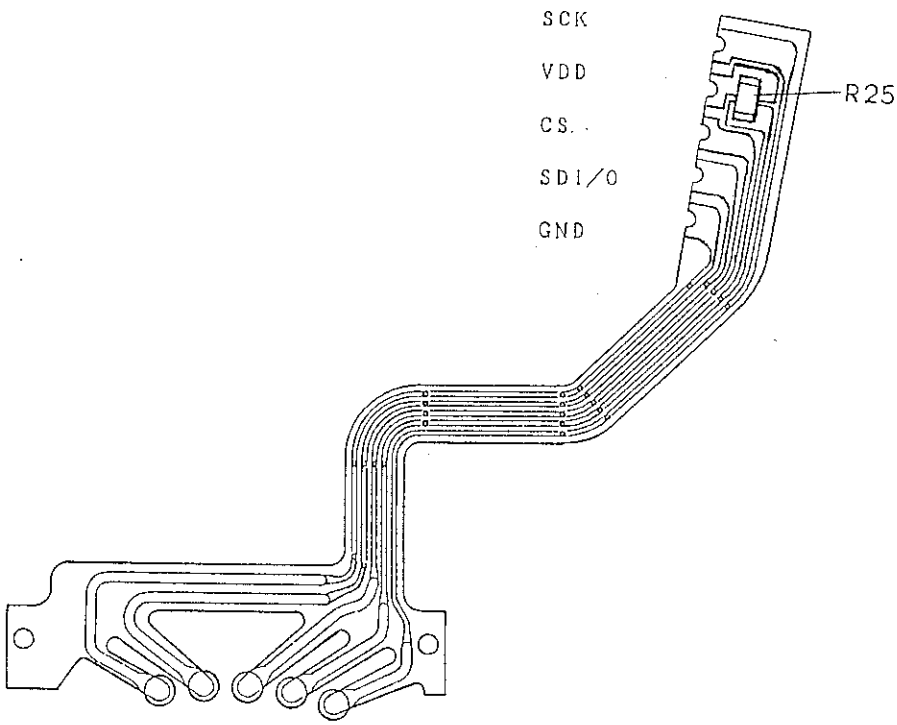
Drive FPC Back Pattern



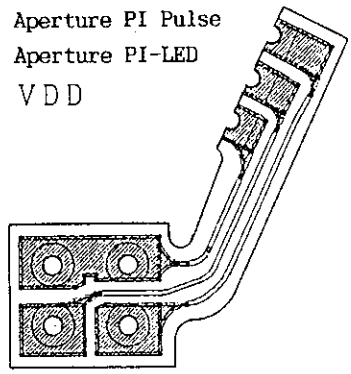
DX-FPC TEST POINTS



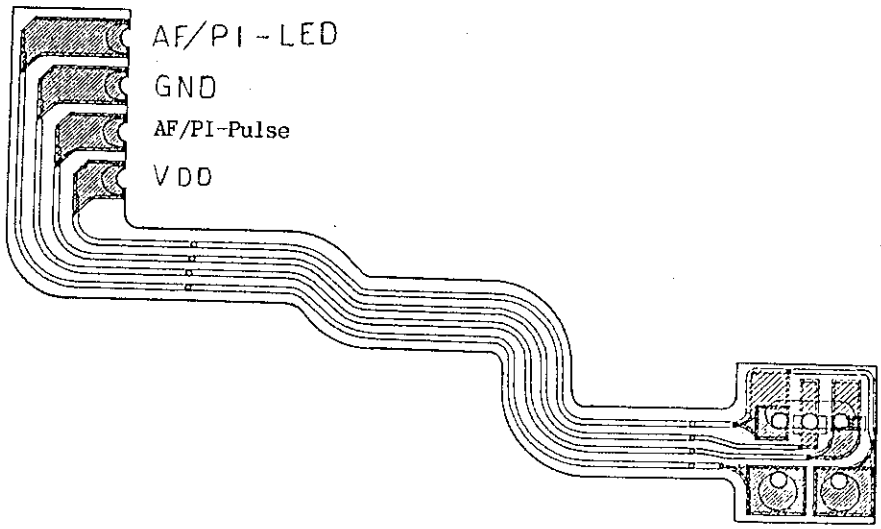
FPC-L TEST POINTS



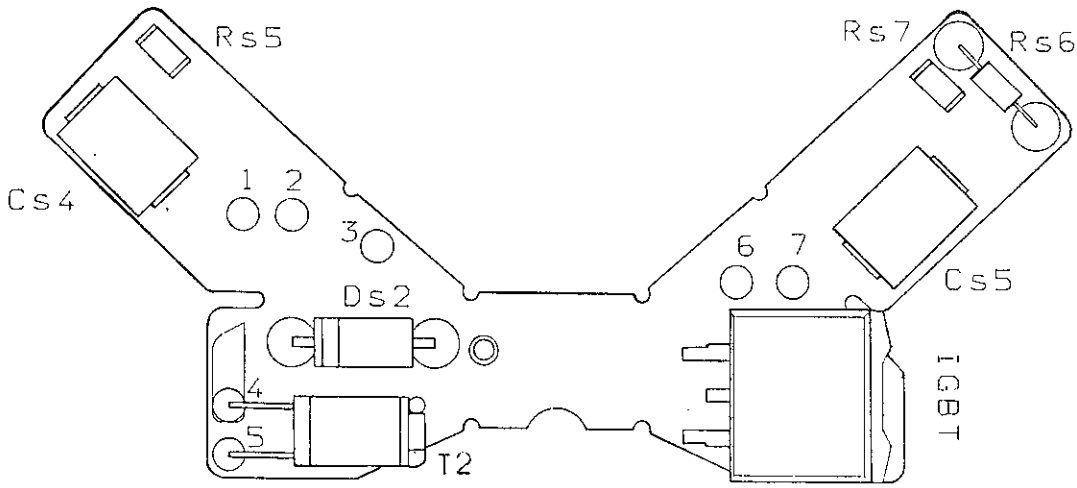
F/PI-FPC TEST POINTS



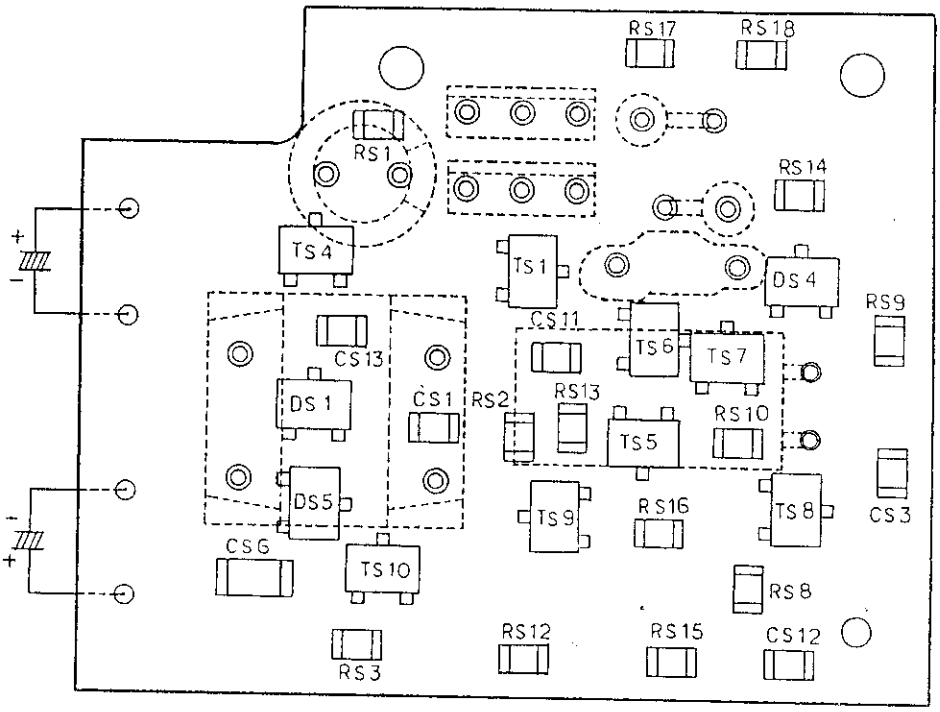
AF/PI-FPC TEST POINTS

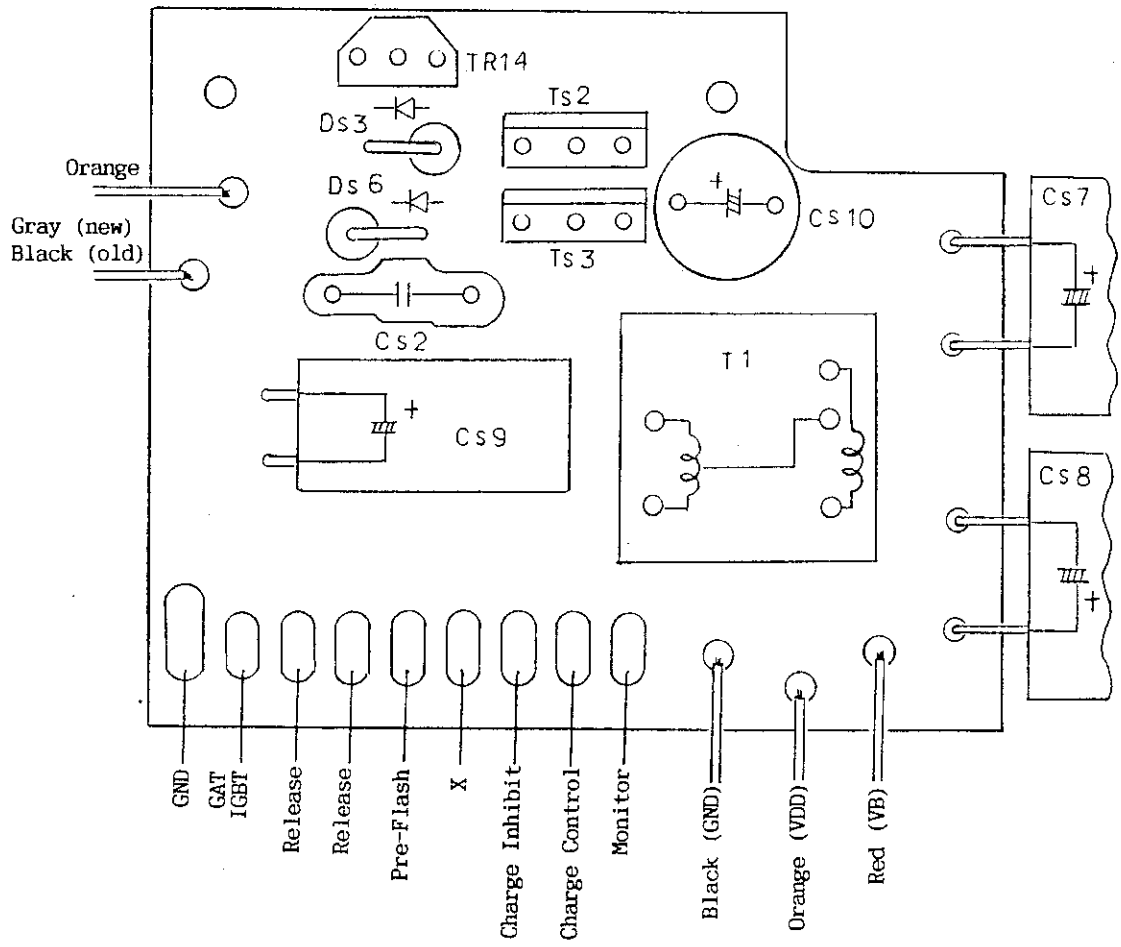


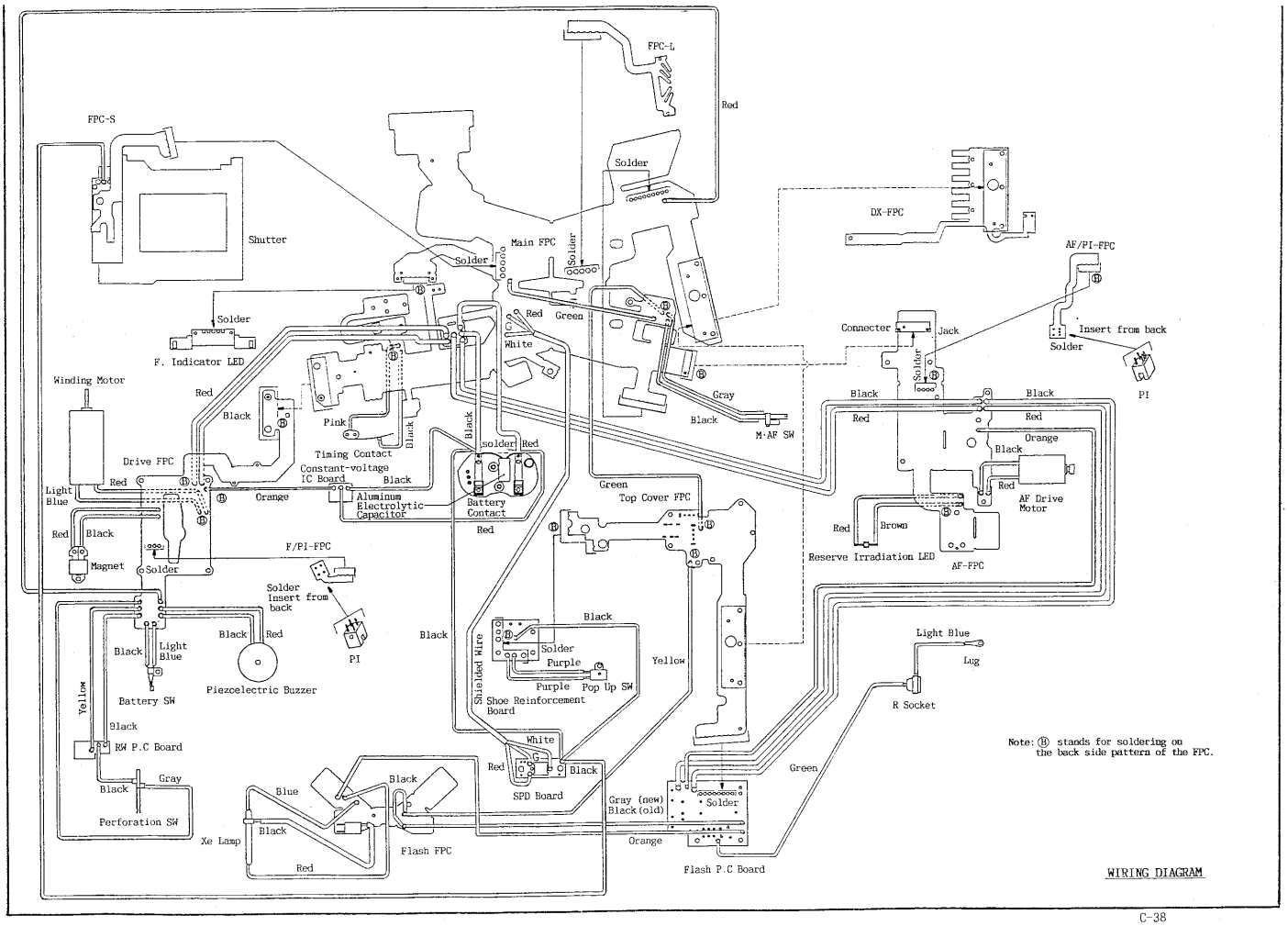
ELECTRIC PARTS ON FLASH FPC



ELECTRIC PARTS ON FLASH BASE PLATE AND TEST POINTS






FPC-L
Red
FPC-S
Solder
Shutter
Main FPC
Solder
Solder
DX-FPC
AF/PI-FPC
Connecter
Jack
Insert from back
Solder
PI
Solder
F. Indicator LED
Red
Green
White
Winding Motor
Red
Black
Pink
Black
Black
Gray
Black
M·AF SW
Black
Black
Red
Red
Orange
Black
Red
AF Drive Motor
Drive FPC
Timing Contact
Constant-voltage IC Board
Black
Solder
Red
Light Blue
Red
Orange
Aluminum Electrolytic Capacitor
Battery Contact
Red
Green
Top Cover FPC
Red
Black
Magnet
Solder
F/PI-FPC
Red
Brown
Reserve Irradiation LED
AF-FPC
Solder Insert from back
PI
Black
Black
Light Blue
Black
Red
Piezoelectric Buzzer
Black
Shielded Wire
Solder
Purple
Purple
Pop Up SW
Shoe Reinforcement Board
Yellow
Light Blue
Lug
R Socket
Yellow
Battery SW
Black
RW P.C Board
White
Red
Black
SPD Board
Green
Gray
Black
Perforation SW
Blue
Black
Gray (new)
Black (old)
Solder
Xe Lamp
Black
Flash FPC
Orange
Red
Flash P.C Board
Note: Ⓑ stands for soldering on the back side pattern of the FPC.
WIRING DIAGRAM

D TROUBLESHOOTING GUIDE

1.Camera no Power Supply at all

1)Dirty or depressed Battery Contact.

2)Defective soldering of the red or black lead wire from the Battery Contact or of the Main FPC on the side of the M.Box.

3)Battery Contact kept ON.

4)Defective soldering of Tr1 or defective Tr1.

5)Defective soldering of the S-CPU 54 pin terminal.

6)Defective soldering of D2 or defective D2.

7)Defective soldering of D1 or defective D1.

8)Defective Constant-voltage IC Board.

9)Broken pattern of Main FPC.

2.Camera not operating

1)Burnt-out DC-DC Converter.

2)M. Box short-circuited on the back of the Drive FPC.

* Stick acetate cloth tape to the old Drive FPC.

* Change the position of electric parts on the new Drive FPC.

3)Orange lead wire (AF-FPC←→Flash P.C Board) of the power line between the AF-V_{DD} line and the Flash P.C Board pinched between the Front Cover and the M. Box and thus is short-circuiting.

3.Faulty power hold Circuit

1)Defective soldering of the S-CPU 34 pin terminal.

2)"L" signal not output from the S-CPU 34 pin when the power hold factor switch is turned ON----- Defective S-CPU.

3)Defective soldering of the P.H. terminal of the DC-DC Converter and Main CPU.

4)Defective DC-DC Converter----- Check the V_{DD}:5V power.

4.Faulty LCD display

4-1 All letters on LCD Panel not lighting up

1)Defective soldering of R16 or defective R16.

2)Defective soldering of R17 or defective R17.

3)Defective soldering of R18 or defective R18.

4-2 All segments using COM line not lighting up

1)COM 0～2 disconnected.

4-3 All segments using SEG line not lighting up

1)SEG 0～29 disconnected.

4-4 Unexpecte parts lighting up or lighting dimly

1)Line short-circuited.

4-5 LCD display coming on and off

1)Defective 32KHz quartz oscillator.

4-6 Faulty LCD display

1)Distorted LCD Holder.

2)Defective soldering of the 32KHz quartz oscillator.

3)Defective installation of the LCD Panel.

4)Defective soldering of R5 or defective R5.

5)Defective soldering of C2 or C3.

6)Defective LCD Panel.

4-7 Drive display not changing

1)Matrix Switch output wire in the Main FPC short-circuited.

4-8 Film Advance mark not lighting up

1)Defective LCD Panel.

5.Faulty Film Counter display

5-1 Film Counter not displaying

1)Defective soldering of the black lead wire (Perforation SW←→RW Base Plate).

5-2 Film counter not counting up

1)Defective soldering of the gray lead wire (Perforation SW←→ Drive FPC).

2)Dirty Perforation Switch or defective contact.

3)Defective soldering of the M-CPU 62pin.

6.Faulty display within viewfinder

6-1 Applicable LED not lighting up

1)Defective soldering of R40, R41, R42 or R43.

2)Defective soldering of M-CPU 12pin, 13pin, 14pin or 15pin terminal.

3)Defective soldering of the Main FPC and F Indicator LED (See Fig.13).

6-2 Mutual LEDs coming on and off at signal timing

1)Each signal line short-circuited.

7.Faulty shutter mechanism

7-1 Shutter not operating

1)Defective soldering of the Release Switch.

2)Foreign matter in the Winding Base Plate (upper).

3)Foreign matter in the Winding Base Plate (lower).

4)Defective soldering of the red or blue lead wire of the Winding Motor.

5)Defective soldering of the S-CPU 64pin terminal.

6)AE-L of the Materix Switch short-circuited to GND.

7)Broken input transistor (Tr14) of the Release Socket.

8)Legs of electric parts on the Flash P.C Board short-circuited to the Triopod Socket Holder Base Plate.

9)Abnormal TEST-MODE input value.

10)Defective insulation of the Drive FPC (ST board).

11)Disconnection of the Main FPC (S-CPU～Release SW).

12)Defective Drive IC (IC-7).

13)Defective FC Lever operation.

14)Charge Lever Spring (168745) has slipped out from the Charge Lever.

7-2 Mirror remains flipped up and Camera does not operate

1)Defective contact of the Timing Switch.

2)Defective soldering of the pink or black lead wire of the Timing Switch.

3)Defective soldering of FET.

4)Foreign matter in the Winding Base Plate (upper).

5)Foreign matter in the Winding Base Plate (lower).

6)Defective Drive IC (IC-6).

7-3 Shutter does not operate at CIF

1)Disconnection of the AF connection V_{DD} line.

7-4 Shutter does not operate with lens attached

1)Auto focus not operating----- Defective soldering of the M-CPU terminal.

2)Defective soldering of the FC Photocoupler.

7-5 Mirror remains flipped up with lens attached

1)Disconnection of the FC Photocoupler FPC.

2)Defective soldering of the FC Photocoupler and F/PI-FPC.

3)Abnormal TEST-MODE input value.

7-6 Shutter released once only

1)Defective soldering of the external release input transistor (Tr14) of the Flash P.C Board.

7-7 Shutter blade not opening

1)Defective soldering of the Shutter FPC and Shutter Unit.

2)Defective soldering of the Shutter FPC and Main FPC.

3)Defective soldering of Tr4 or defective Tr4.

4)Dirty or disconnected Shutter Magnet.

5)Defective soldering of the M-CPU 60pin or 61pin terminal.

6)Defective Shutter Unit.

7-8 Shutter speed not correct above 1/90

1)Disconnection of GND for the Top Cover at the battery contact.

8.Faulty exposure

8-1 Incorrect exposure value

1)Defective soldering of the Shieled Wire.

2)Abnormal TEST-MODE input value.

3)Shielded Wire is pinched by the Top Cover.

4)Shielded Wire short-circuited.

5)Defective SPD-IC.

6)Defective soldering of the AE-IC terminal.

7)Incorrect reference voltage (V_R-V_S=445mV)-----Adjust the reference voltage.

8-2 Underexposure

1)Defective soldering of the F. PI-FPC and Photocoupler.

2)Defective soldering of the F. PI-FPC and Drive FPC.

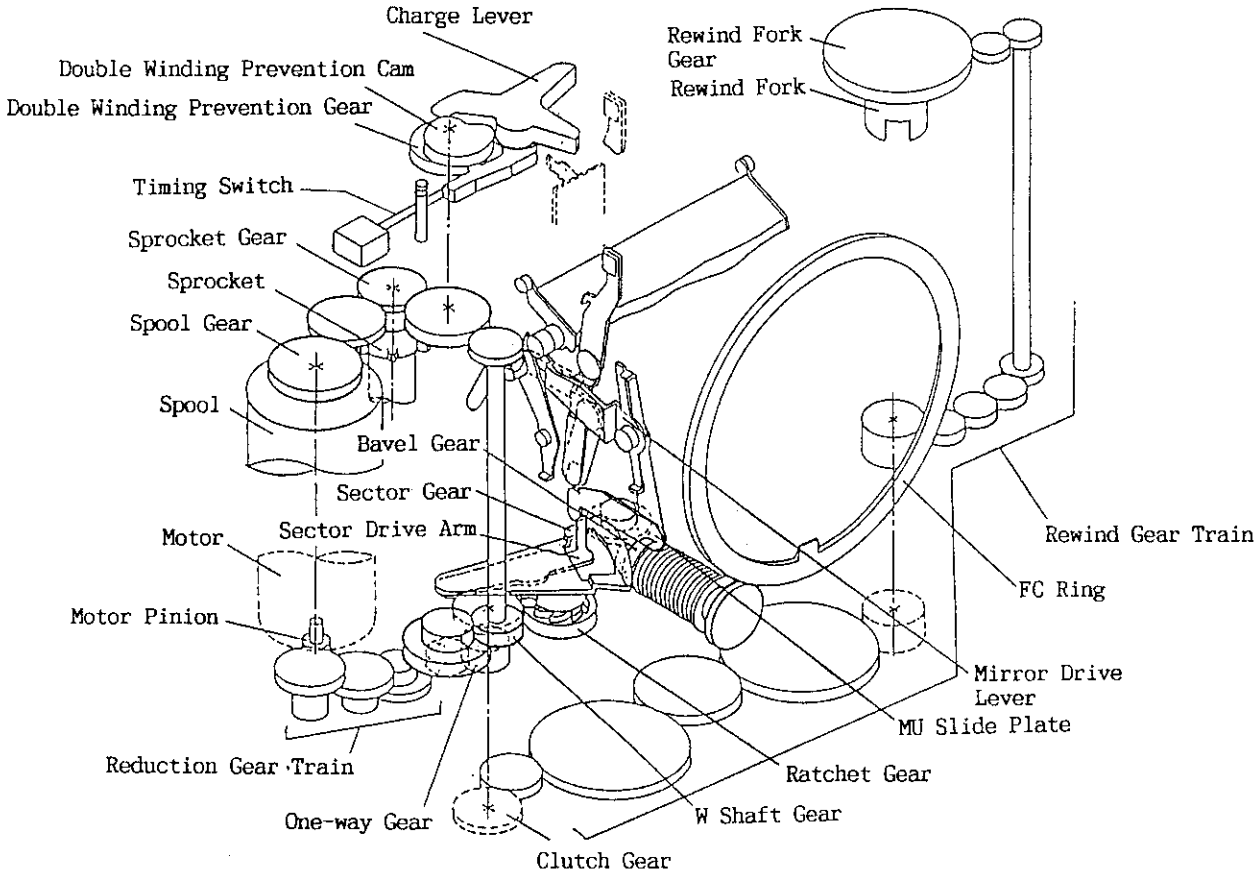
3)Defective soldering of the red or black lead wire from the FC Magnet.

4)Defective FC Lever (168210) operation.

(3) Film rewind

There are a button and lever for use at rewinding on the bottom of the camera body. At press of the button, the sprocket and spool are released and the lever slides to disengage the mirror-up gear train from the motor gear train and engage the rewind gear train. Simultaneously the motor start switch is turned on to start rewinding.
At completion of rewinding, the stop of the motor is commanded by a signal from the film detector switch and the rewind gear train is restored to the initial position by the opening and closing of the back cover.

PARTS CONFIGURATION



5)Excessive play of the FC Lever (168210).

6)Defective soldering of Tr2 or defective Tr2.

7)Defective FC Magnet.

8)Defective F. Photocoupler.

9.Faulty AF (Auto Focus)

9-1 No focusing due to defective AF circuit

* Before checking the AF circuit, check to see if the ROM is reading properly.

ⓐ See if the signal pin of the mount is properly in contact with the lens contact.

ⓑ See if the lens ROM FPC is disconnected.

ⓒ See if the lens ROM FPC is connected properly with the Main FPC. (Defective or short-circuited soldering)

ⓓ See if there is disconnection on the Main FPC side.

* AF circuit (Check the CPU terminals or test points.)

1)Disconnection of AF power supply of 12V
Even if there is halfway disconnection of the 12V line, a voltage of a few V is present at the test point.
With the lens moving forward and backward, focusing can not be achieved wherever the camera is directed.

2)Disconnection of AF power supply of 5V
A voltage of a few V is present at the test point.
The camera focuses when the subject is bright and of sharp contrast.
But it does not focus when the condition is less ideal (though a normal camera may focus quite easily).

3)Disconnection of CK, RESET, CG, CH or TG signal line
The camera does not perform AF operation at all, though it does light metering.

4)Disconnection of TR or AD signal line
The camera performs neither AF operation nor light metering.

5)Disconnection of OUT signal line
The lens moves, but no focusing results.

6)Disconnection of AGC 0 to 2
The camera does not focus where a normal camera does when the condition of the subject is changed variously. The performances is below normal.

7)Disconnection of O/M signal
The lens moves, but no focusing results.

9-2 Faulty AF drive circuit/AF-PI

①Lens does not move, but AF auxiliary light lights up with check switch ON when the camera is directed to dark area.

1)Disconnection of both AF drive signal line IN1 and IN2.

2)Defective soldering if the red or black lead wire of the AF Motor.

3)V_B (6V) not supplied to the AF/PI-FPC.

4)Damaged AF Drive IC (IC-7).

5)Defective soldering of R28 or defective R28.

②Lens moves little by little by repetition of ON and OFF of check switch and results in focusing.

1)Defective soldering of AF-PI and AF/PI-FPC.

2)Disconnection of the LED line of AF-PI.

3)Disconnection of the pulse output line of AF-PI.

4)Damaged AF-PI.

③Lens moves in one direction only.

1)Disconnection of either AF drive signal line IN1 or IN2.

9-3 Faulty position of AF Module Ass'y

1)Incorrect pitch adjustment.

• AF distance metering is not achieved at targeted position.

2)Incorrect yaw adjustment.

• Focusing is hard to achieve.

• Focusing does not result at low brightness.

• Aimed position deviates right or left within viewfinder.

3)Incorrect Z adjustment.

• Focusing can not be achieved.

• AF adjustment (adjusted value No.5) can not be made.

9-4 Dust adhering to CCD sensor

*The upper filter surface of the AF Module is closer to the imaging surface than the hole in the bottom of the M. box, so that even a dust particle of about 30 μm can affect distance metering greatly.

1)Small-sized dust adhering to the CCD sensor.

- Focusing is not accurate.

2)Middle-sized dust adhering to the CCD sensor.

- Focusing results at wrong distance. The lens moves for long distance even though the subject is in a close distance.
- It takes more than normal time before focusing . The lens repeats reciprocating motion around the focus.

3)Large-sized dust adhering to the CCD sensor.

- The lens moves to the close-range position and does not move back.

9-5 Other kind of non-focusing

1)Defective soldering of C5 or defective C5.

- Receiving the A-D conversion noise of CPU, the AF performance lowers, achieving focusing when the condition is good and not achieving it when the condition is bad.

2)Bent sub-mirror

- AF operates, but does not accomplish focusing.

3)Contact of the AF/MF switching contact not breaking.

4)Disconnection of the AF Connector (V_{DD}-ϕTr line).

5)AF FPC land (motor +/-) short-circuited.

6)AF Motor lead wire land short-circuited ($V_B \sim$GND).

7)Incorrect wiring of the V_B lead wire (red) of the AF FPC.

8)Defective soldering of the motor control signal AF Connector.

9-6 Faulty AF auxiliry light

1)No focusing when the reserve irradiation LED keeps lighting due to short-circuit.

2)Failure of distance metering in total darkness when the reserve irradiation LED does not light up due to circuit disconnection or like cause even if the AF auxiliary light is on.

10.Faulty Flash

10-1 Flash does not charge at all when pop-up the Flash

1) See the movement of the ammeter at Pop-up the Flash with power on.
   Current flows ——→(2)
   Current does not flow. ——→(3)

2) See the movement of the needle when the current stops.

- There is a short-circuite within the Flash P.C Board when the current does not stop in 2 or 3 seconds. ——→Replace the Flash P.C Board.
- Normal charge is taking place when the current drops directly to 100mA.
- The protective circuit is working when the current drops slowly to several hundred mA.

Check items:

① Check the adjusted value of charging voltage.
   O.K. if the value of No.11 is -3 in manual adjusting mode.
   Otherwise, set -3 and recheck from (1).

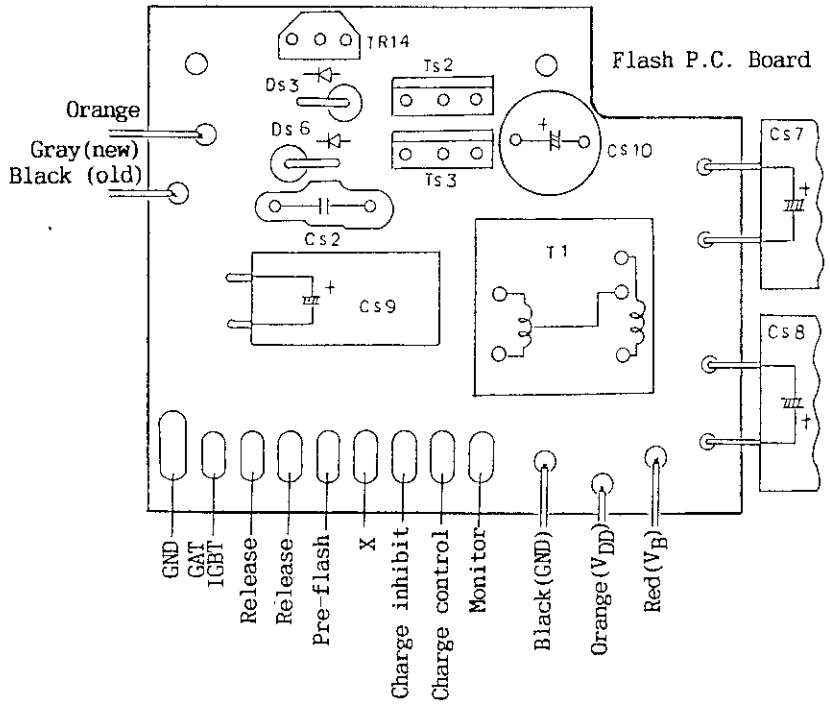
② Check the soldering of the Pop-up Switch of the Top Cover.

③ Check with a tester to see if the M-CPU 47pin terminal is connected with the monitor position of the solder surface of the Flash P.C Board.
   *If connected ——→ ⑤
   *If not connected ——→ ④

④ Check the connection of the Top Cover FPC and the Main FPC.
   See if the Body Connector Retaing Plate Set Screws are properly tightened.
   See if pattern dislocation is causing a short to the adjacent pattern.
   See if the FPC pattern is damaged by the positioning pin of the FPC.

⑤ Check with a tester to see if the monitor signal is shorted to GND.

When any of the above conditions does not apply, the monitor of the Flash P.C Board is abnormal.——→ Replace the Flash P.C Board.



3)When charging current not flowing:

See if a release takes place in the Pop-up the Flash state.
Release takes place. ——→From ①
Release does not take place. ——→From ③

①See if the charge mark in the viewfinder is lighting.
- When it is lighting, discharge with a discharger.
  Then ——→(1)

- When the current does not flow after discharging:
  ——→Defective soldering of the black lead wire from the Top Cover.
  ——→Short of CH terminal (M-CPU 47pin).

②When the charge mark is not lighting, the Pop-up Switch has not switched.
Check with a tester to see if there is conduction at the Pop-up Switch. (left-hand switch, facing the mount) in the Pop-up state.

*When there is conduction:
Check items
- Move the switch in the Pop-up state with tweezers and see if the switch moves smoothly.

- See if the Hot Shoe P.C Board and the lead wire of the switch are properly soldered.

- See if there is a short between the solder of the Hot Shoe Board and FPC and the board locking screw.
  (By the side of the solder position of the switch lead wire: On the Top Cover FPC side).

When any of the above conditions does not apply, undo the connection with the Main FPC and check the conduction of the switch again.

If there is conduction, the Top Cover FPC is short-circuited.——→Replace the Top Cover.
If there is no conduction, the Main FPC is short-circuited. ——→Replace the Main FPC.

*When there is no conduction:
Disconnection between the switch line and M-CPU.
Check items
- Check the connection of the Top Cover FPC and the Main FPC.

See if the Body Connector Retaining Plate Set Screws are properly tightened.
See if pattern dislocation is causing a short to the adjacent pattern.
See if the FPC pattern is damaged by the positioning pin of the FPC.

- Check the soldering of the M-CPU 46pin terminal.

- Remove the Body connector, and check the conduction of the connector pattern of the Top Cover and the switch.

If there is conduction, the Top Cover FPC is short-circuited.——→Replace the Top Cover.
If there is no conduction, the Main FPC is short-circuited. ——→Replace the Main FPC.

③When release does not take place:
Check the AF FPC-side solder position of the orange lead wire from the Flash P.C Board. = Defective soldering of the red lead wire on the V_B Flash P.C Board.

④Turn the power ON by operating the Main Switch ⟶ OFF ⟶ ON. Operate pop-up the Flash with power ON. Check the voltage (V_{DD}) of the orange lead wire within 10 seconds.

Note:

When 10 seconds passed, the battery warning mark will light up. In this case, the voltage becomes 0V. Then turn the Main Switch OFF and ON, and perform the check once again.

- O.K. if the voltage is 4.5V to 5.5V.⟶ ⑤
- Disconnection at the Main and AF FPC connector when the voltage is 0V.
  ⟶Repair by soldering the connector.
  ⟶Or apply V_{DD} to the AF FPC by the lead wire from the Main FPC. (Soldered connection of Lens FPC and Main FPC, V_{DD} is second from the Penta Prism top.)

⑤Check the voltage of V_B of the Flash P.C Board. (Check can be made with power OFF.)
O.K. if the voltage is 5V to 6V.
When the voltage is 0V, check the lead wires (both red and black) from the battery to the Flash P.C Board.
Battery
～Relay land on FPC (grip side)
～Relay land (AF lock button side)
～Flash P.C Board

⑥Operate the Main Switch ⟶ OFF ⟶ ON in pop-up the Flash state, and check the voltage of the charge start signal within 10 seconds.

Charge start signal = Soldered connection of the Flash P.C Board and Top Cover (Charge control part)

- O.K. if the voltage is 4.5V to 5.5V.⟶ ⑦
- When the voltage is 0V, check the conduction of the M-CPU 1pin terminal and Flash P.C Board.

If there is no conduction ⟶ Check the connection of the Main FPC and top cover FPV.
If there is conduction ⟶ Check for short to GND.

⑦Operate the Main Switch ⟶ OFF ⟶ ON, and check the voltage of the charge inhibit signal within 10 seconds.

Note:

When 10 seconds passed, the battery warning mark will light up. In this case, the voltage becomes 0V. Then turn the Main Switch OFF and ON, and perform the check once again.

- O.K. if the voltage is 0.5V to 0.8V.⟶ Defective Flash P.C Board. Replace the Flash P.C Board.

•Charge inhibit state if the voltage is 0.2V or below.

Check items
Defective soldering of AE IC 11pin or 13pin.
Defective soldering of R56 on the Main FPC or defective R56.

10-2 Flash not working

1)Defective solder connection at the X part of the Shutter FPC and Main FPC.

2)Defective solder connection at the X part of the Shutter FPC and Shutter unit.

3)Defective solder connection at the X part of the Top Cover FPC and Flash P.C Board.

4)Defective soldering of the red, black or blue lead wire at the Flash FPC.

5)Defective soldering of the green lead wire (Top Cover FPC ⟷ Main FPC).

6)Defective soldering of the yellow lead wire (Top Cover FPC ⟷ Main FPC).

7)Defective soldering of the orange lead wire (Flash P.C Board ⟷ Flash FPC).

8)Defective trigger coil (T2) or IGBT.

9)Defective Xenon lamp.

10)Defective Flash P.C Board.

11)Defective Flash FPC.

11.Defective Self-timer LED

11-1 Self-timer LED not lighting up

1)Defective soldering of Tr9 or defective Tr9.

2)Defective soldering of Tr11 or defective Tr11.

3)Defective soldering of R44 or defective R44.

4)Defective soldering of R48 or defective R48.
•Disconnection at R48 will damage Tr10, thus causing the Self-timer LED not to light up.

5)Defective soldering of Tr10 or defective Tr10.
•Damaged Tr10 will cause the failure of the Self-timer LED, which then will not light up.

12.Short -circuit

12-1 Short -circuit

1)Short -circuit on the back of the AF FPC test pattern.

2)Short -circuit between the Rewind Spring and contact.

3)Defective Flash P.C Board.

4)Short -circuit on the M. Box side land ($V_B \sim$ GND).

5)Reversed soldering of the red and black lead wires.
(Flash P.C Board ⟷ AF FPC) (V_B,GND)

6)Short -circuit of the power transistor of the Flash P.C Board.

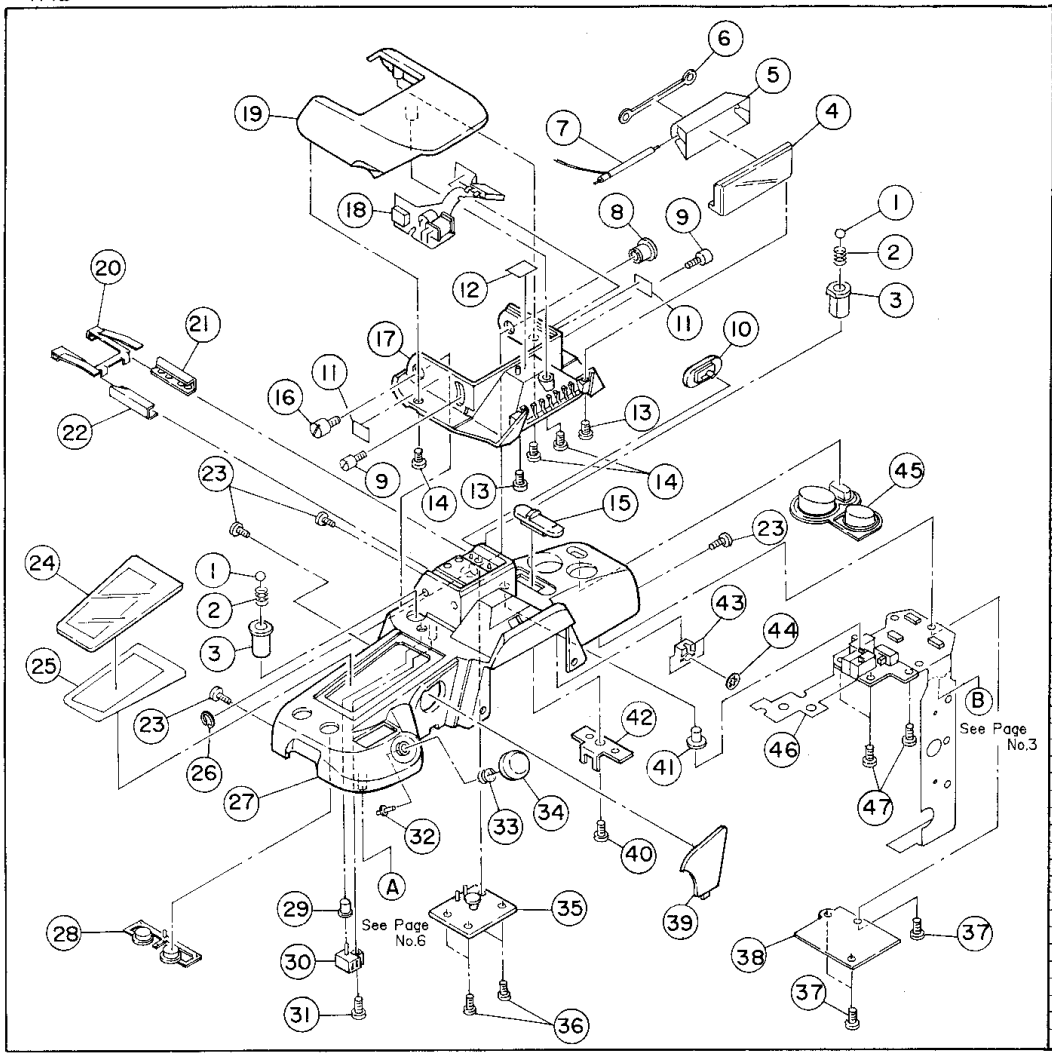
YASHICA

270 Auto Focus
230-AF SUPER

ASSEMBLING CHART

KYOCERA CORPORATION
Optical Equipments Division

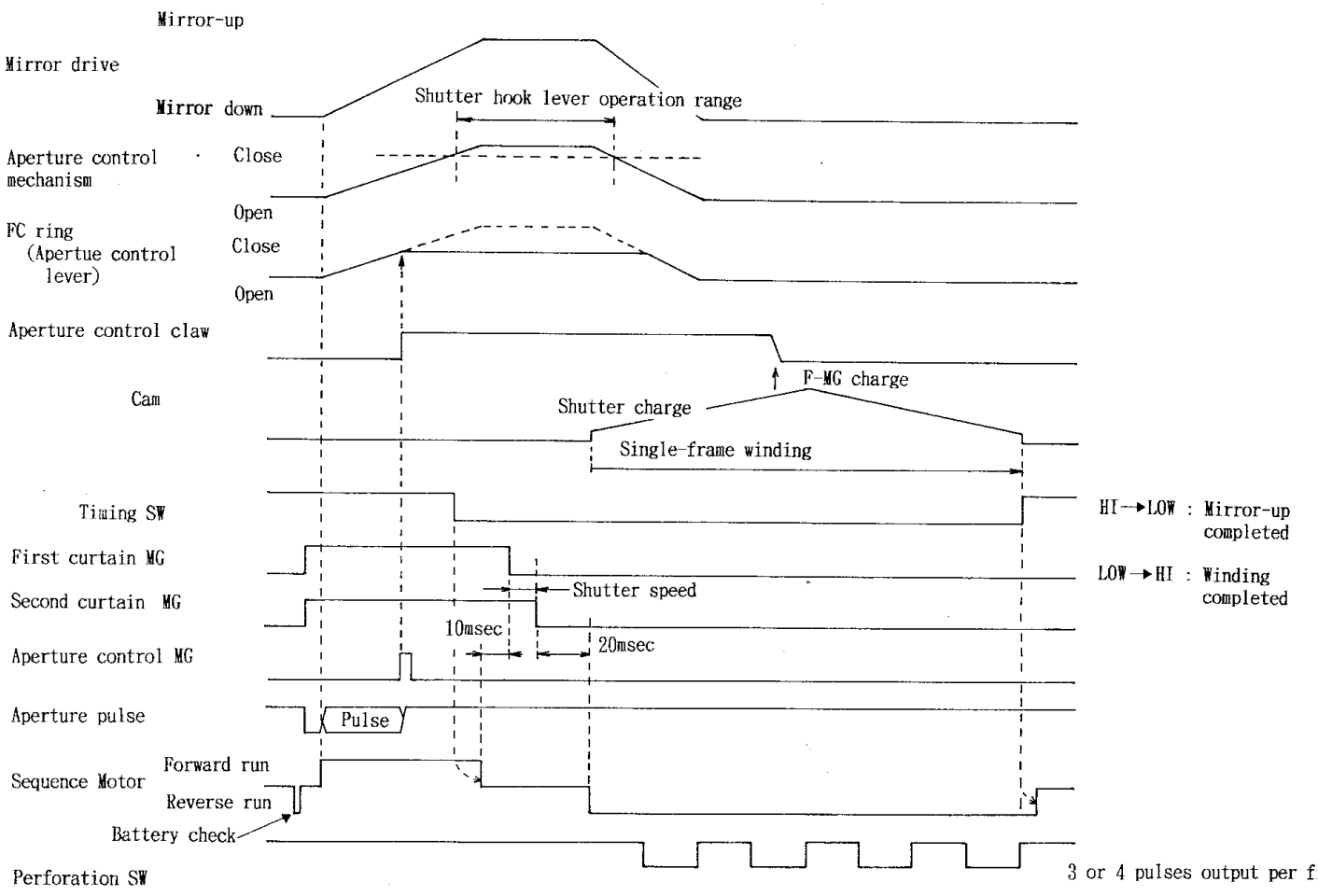
SERVICE 911210

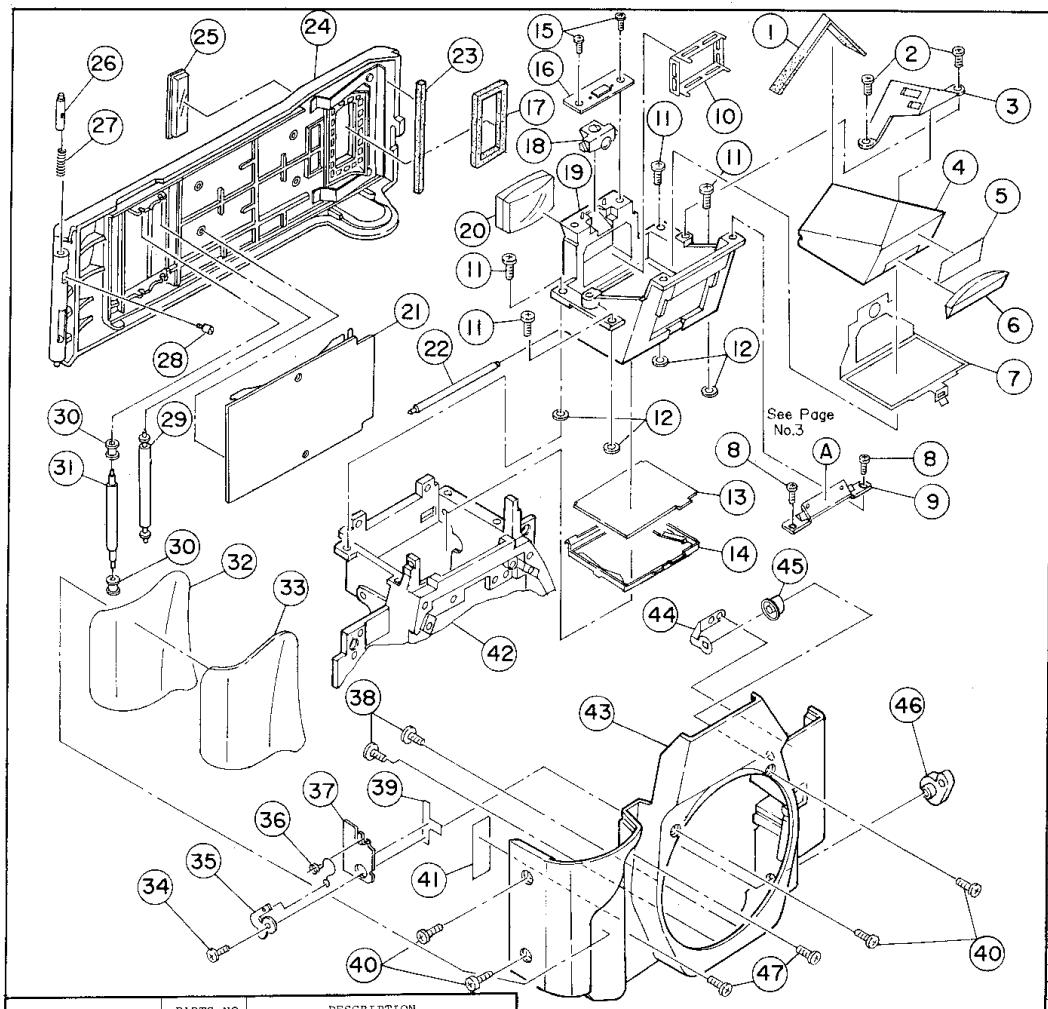


	PARTS NO.	DESCRIPTION	Q'TY
1	66703020	STEEL BALL (30ø)	2
2	1AD 23300	S.B CLICK SPRING	2
3	1AD 20300	S.B CLICK CUP	2
4	1AD 23100	DIFFUSER	1
5	1AD 23000	REFLECTOR	1
6	1AD 23200	XENON LAMP HOLDER RUBBER	1
7	3AJ 52200	XENON LAMP	1
8	1AD 22710	S. BASE SHAFT (RIGHT)	1
9	1AD 22910	S.B STOPPER	2
10	1AD 22220	PRE-FLASH LEVER	1
11	*	DOUBLE STICK TAPE	2
12	*	DOUBLE STICK TAPE	1
13	69113576	DIFFUSER S.S	2
14	69113576	FLASH COVER S.S	3
15	1AD 21600	MAIN SW LEVER	1
16	1AD 22810	S. BASE SHAFT (LEFT)	1
17	1AD 22640	FLASH BASE	1
18	1AD AE170	FLASH FPC ASS'Y	1
19	1AD 22510	FLASH COVER	1
20	168 20640	SHOE PLATE SPRING	1
21	168 20210	ACCESSORY SHOE (RIGHT)	1
22	168 24010	ACCESSORY SHOE (LEFT)	1
23	69113079	TOP COVER S.S	4
24	1AD 20800	LCD WINDOW	1
25	1AD 20912	LCD WINDOW TAPE	1
26	66150425	CE RING	1
27	*	TOP COVER	1
28	1AD 21900	FOCUS LIMIT BUTTON	1
29	1AD 23720	P. SW CUP	1
30	1AD 23600	POP-UP SW	1
31	69214576	POP-UP SW S.S	1
32	1AD 21500	RELEASE BUTTON STOPPER	1
33	1AD 21400	RELEASE BUTTON SPRING	1
34	1AD 21340	RELEASE BUTTON	1
35	1AD AF100	SHOE REINFORCEMENT BOARD ASS'Y	1
36	63913722	ACCESSORY SHOE S.S	4
37	69113576	MODE BUTTON BACK PLATE S.S	3
38	1AD 22110	MODE BUTTON BACK PLATE	1
39	1AD 21110	AF AUXILIARY LIGHT WINDOW	1
40	69213576	MAIN SW PLATE S.S	1
41	1AD 23410	S. SW CUP	1
42	1AD 21800	MAIN SW LEVER	1
43	1AD 22400	PRE-FLASH SW PLATE	1
44	66161524	CS SNAP RING	1
45	1AD 22020	MODE BUTTON	1
46	1AD AE190	TOP COVER FPC ASS'Y	1
47	69113576	TOP COVER FPC S.S	3
4-7,13,17,			
	1AD AD610	FLASH ASS'Y	
1-22,24-47			
	1AD AD600	TOP COVER ASS'Y (For 270Auto Focus)	1
	1AD AD60W	TOP COVER ASS'Y (For 230 AF Super)	1

PARTS MARKED * ARE NOT AVAILABLE

RELEASE SEQUENCE TIME CHART



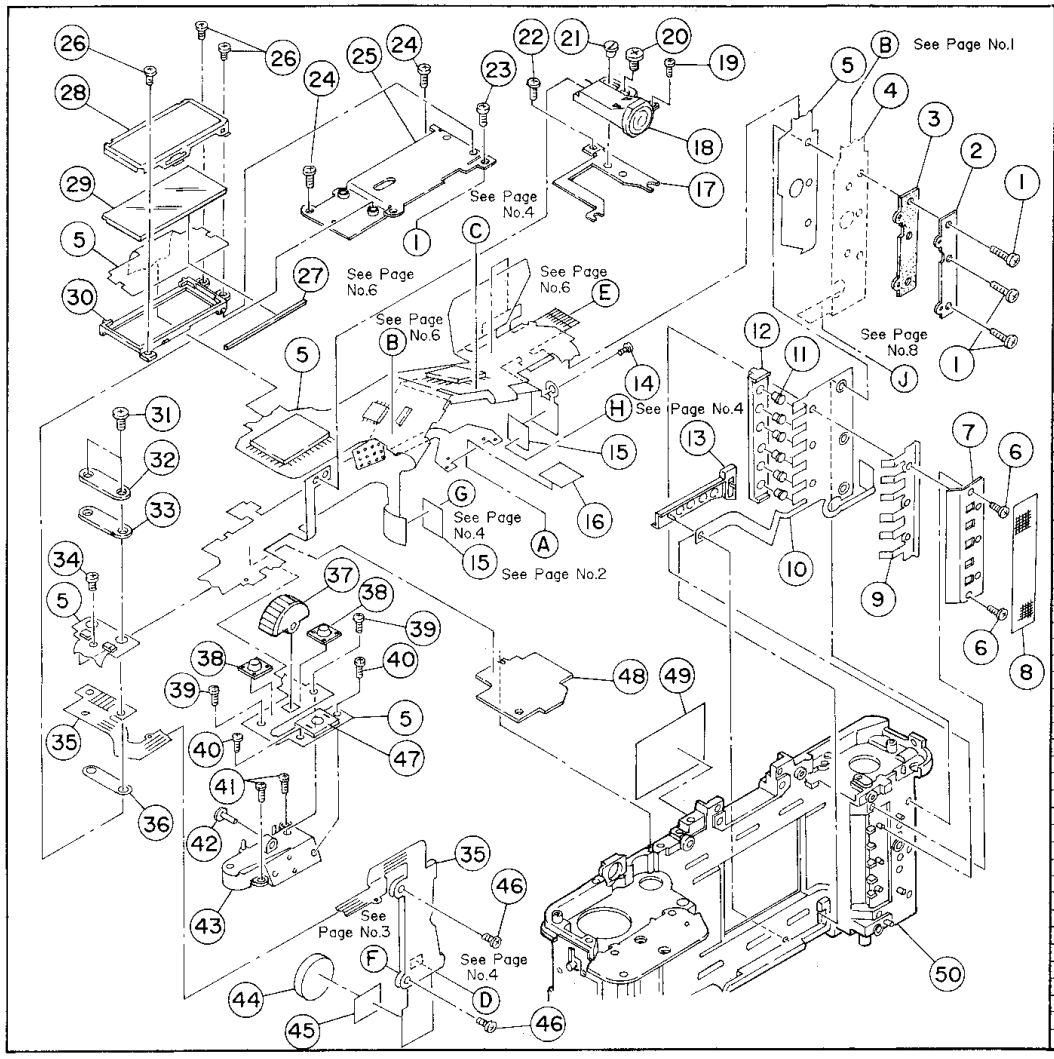


	PARTS NO.	DESCRIPTION	Q'TY
1	147 88100	PENTA DUST-PROOF MOQUETTE	1
2	69213576	PENTA PRISM RETAINER S.S	2
3	168 88300	PENTA PRISH RETAINER	1
4	168 88200	PENTA PRISM	1
5	168 89800	GHOST LIGHT-PROOF PAPER	1
6	169 89600	F. INDICATOR LENS	1
7	168 87810	FINDER MASK FRAME	1
8	69113576	F. INDICATOR LED S.S	2
9	1AD 51700	F. INDICATOR LED	1
10	168 87700	EYE-PIECE APERTURE	1
11	63914026	PENTA PRISM HOLDER S.S	4
12	128 66600	FOCUS ADJUSTMENT WASHER (t:0.05)	4
	168 85900	FOCUS ADJUSTMENT WASHER (t:0.15)	4
	168 86500	FOCUS ADJUSTMENT WASHER (t:0.25)	4
	168 86600	FOCUS ADJUSTMENT WASHER (t:0.35)	4
	168 87000	FOCUS ADJUSTMENT WASHER (t:0.45)	4
	60311812	FOCUS ADJUSTMNET WASHER (t:0.1)	4
	60321810	FOCUS ADJUSTMENT WASHER (t:0.2)	4
	60331817	FOCUS ADJUSTMNET WASHER (t:0.3)	4
	60341812	FOCUS ADJUSTMENT WASHER (t:0.4)	4
	60351810	FOCUS ADJUSTMENT WASHER (t:0.5)	4
	60361816	FOCUS ADJUSTMENT WASHER (t:0.6)	4
13	168 87930	FOCUSING SCREEN	1
14	168 88010	PG HOLDER	1
15	69113076	SPD BOARD S.S	2
16	1AD AE130	SPD BOARD ASS'Y	1
17	168 13910	FILM CHECK WINDOW MOQUETTE	1
18	168 88600	EX PRISM	1
19	169 87640	PENTA PRISM HOLDER	1
20	173 78800	EYE-PIECE LENS	1
21	168 A7200	PRESSURE PLATE ASS'Y	1
22	168 88110	PG HINGE SHAFT	1
23	372 13900	BACK COVER MOQUETTE	1
24	*	BACK COVER	1
25	168 13800	FILM CHECK WINDOW	1
26	168 14700	HINGE SHAFT UPPER	1
27	168 15000	HINGE SHAFT SPRING	1
28	161 11500	HINGE SHAFT RELEASE PIN	1
29	168 13700	FILM ROLLER	1
30	168 14400	FILM ROLLER (B)	2
31	168 14300	FILM ROLLER (A)	1
32	1AD 25200	GRIP STICK TAPE	1
33	1AD 24900	GRIP	1
34	66001074	AF/MF LEVER S.S	1
35	168 82920	AF/MF CLICK LEVER	1
36	168 84810	AF/MF SPRING	1
37	168 84910	AF/MF SPRING HOOK PLATE	1
38	66001149	FRONT COVER SCREW	2
39	168 84700	AF/MF TAPE	1
40	63914529	FRONT COVER S.S	4
41	1AD 56000	RADIATING PLATE	1
42	*	MIRROR BOX	1
43	*	FRONT COVER	1
44	1AD 24700	AT BUTTON SPRING	1
45	1AD 24600	AT BUTTON	1
46	169 82800	AF/MF SELECTOR LEVER	1
47	63915026	FRONT COVER S.S	2
1-7,10,13,14,18-20,22			
	1AD AD100	PENTA PRISM HOLDER ASS'Y	1

PARTS MARKED * ARE NOT AVAILABLE

	PARTS NO.	DESCRIPTION
34-39,41,43,46	1AD AD400	FRONT COVER ASS'Y (For Domerstic
34-39,41,43,46	1AD AD40W	FRONT COVER ASS'Y (For Export)

	PARTS NO.	DESCRIPTION
17,21,23-31	169 A7100	BACK COVER ASS'Y

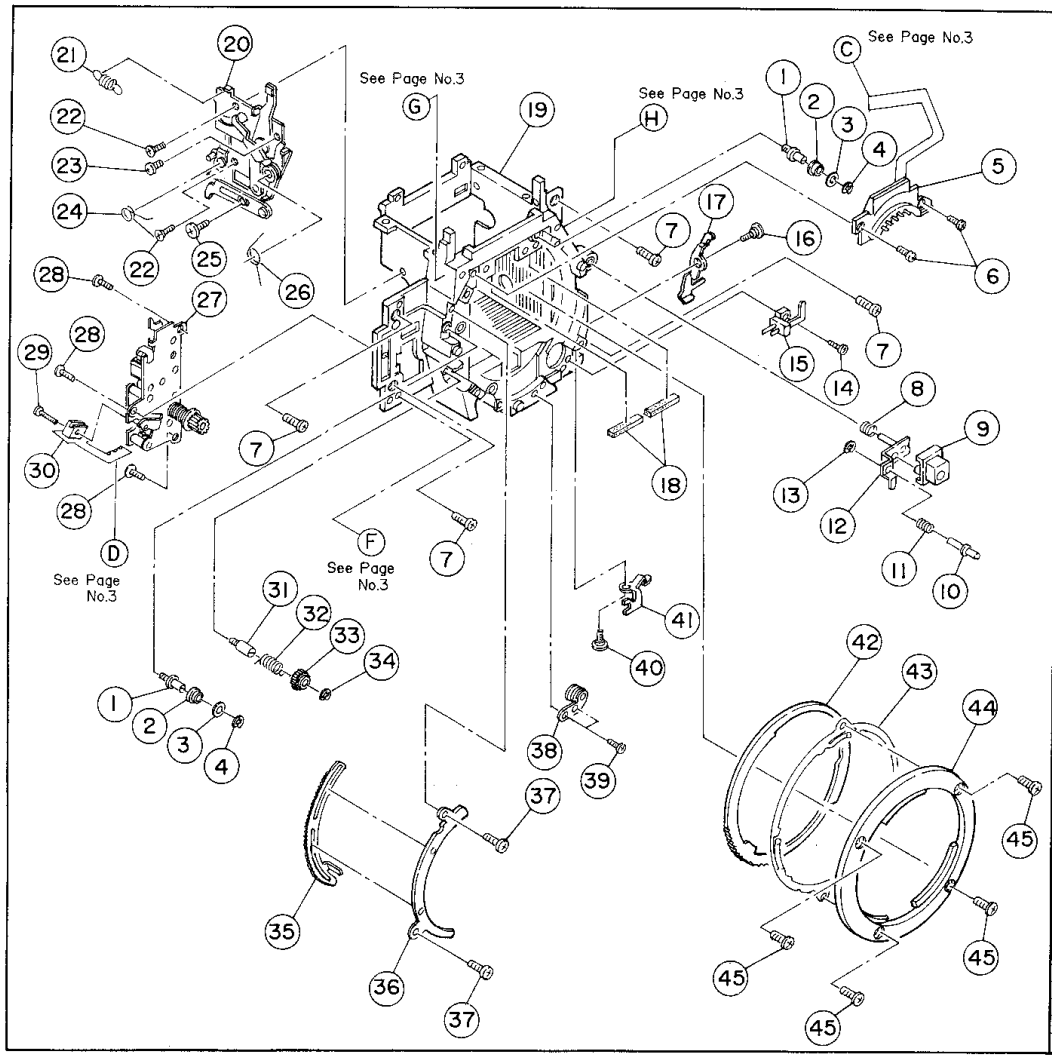


	PARTS NO.	DESCRIPTION	Q'TY
1	69215076	BODY CONNECTOR RETAINING PLATE S.S	3
2	168 17000	BODY CONNECTOR RETAINING PLATE	1
3	168 17100	BODY CONNECTOR RUBBER	1
4	*	TOP COVER FPC (See Page No.1)	1
5	*	MAIN FPC	1
6	69112576	DX RETAINING PLATE S.S	2
7	168 11700	DX RETAINING PLATE	1
8	*	ACETATE CLOTH TAPE	1
9	168 11600	DX RETAINING SPRING	1
10	1AD 50600	DX FPC	1
11	168 11800	DX CONTACT PIN	6
12	168 11500	DX CONTACT HOLDER	1
13	168 11310	DATE BACK CONNECTOR COVER	1
14	61912222	MAIN FPC S.S	1
15	*	DOBULE STICK TAPE	2
16	*	BLACK TAPE	1
17	1AD 17300	S-CPU SUPPORTER	1
18	1AD AD900	AF AUXILIARY LIGHT ASS'Y	1
19	63912026	AF AUXILIARY LIGHT ASS'Y S.S	1
20	66001023	AF AUXILIARY LIGHT ASS'Y S.S	1
21	1AD 18100	AF AUXILIARY LIGHT ADJUSTING SHAFT	1
22	69113076	S-CPU SUPPORTER S.S	1
23	61912026	LCD BASE PLATE S.S	1
24	69113076	LCD BASE PLATE S.S	2
25	1AD AD910	LCD BASE PLATE ASS'Y	1
26	61912026	LCD HOLDER S.S	3
27	1AD 13400	LCD CONNECTOR RUBBER	1
28	1AD 13200	LCD RETAINER	1
29	1AD 50100	LCD PANEL	1
30	1AD 13100	LCD HOLDER	1
31	66001023	ISO CONNECTOR PLATE S.S	2
32	1AA 58000	ISO CONNECTOR PLATE	1
33	1AD 17500	FPC CONNECTOR RUBBER	1
34	66001070	MAIN FPC S.S	1
35	1AD AE120	DRIVE FPC ASS'Y	1
36	1AD 59900	S.INSULATION SHEET	1
37	1AD 12910	UP/DOWN KNOB	1
38	1AD 12700	AE LOCK SWITCH	1
39	69113076	MAIN FPC S.S	2
40	69103076	MAIN FPC S.S	2
41	69114076	UP/DOWN KNOB BASE S.S	2
42	1AD 13000	UP/DOWN KNOB SHAFT	1
43	1AD 12800	UP/DOWN KNOB BASE	1
44	169 51100	PIEZO-ELECTRIC BUZZER ASS'Y	1
45	*	DOUBLE STICK TAPE	1
46	63911526	DRIVE FPC S.S	2
47	396 52700	RELEASE SWITCH	1
48	1AD 51900	DC-DC CONVERTER ASS'Y	1
49	169 14500	PRESSURE PLATE SHEET	1
50	*	BODY	1
5,27-30,37-39,42,43,47,48			
	1AD AE100	MAIN FPC ASS'Y	1

PARTS MARKED * ARE NOT AVAILABLE

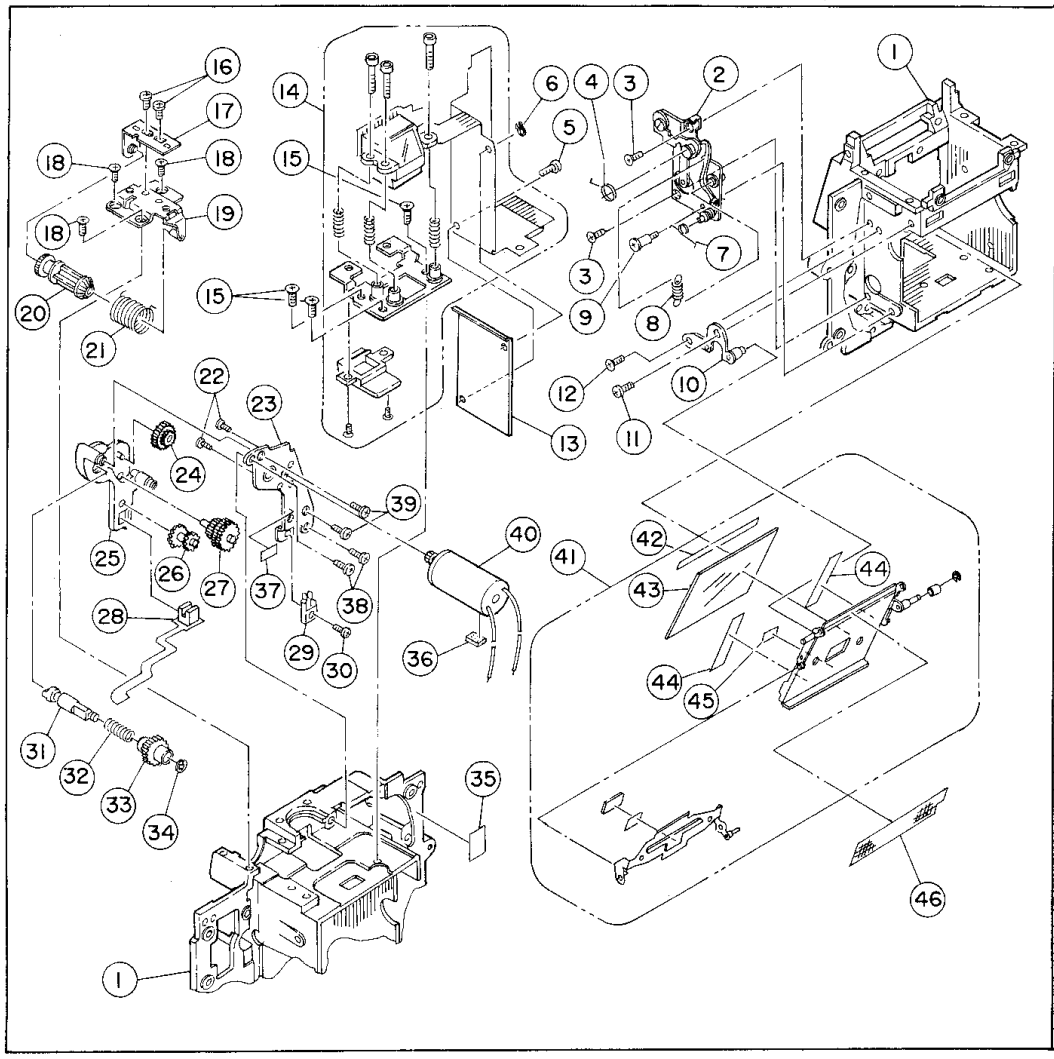
1AD

No.4



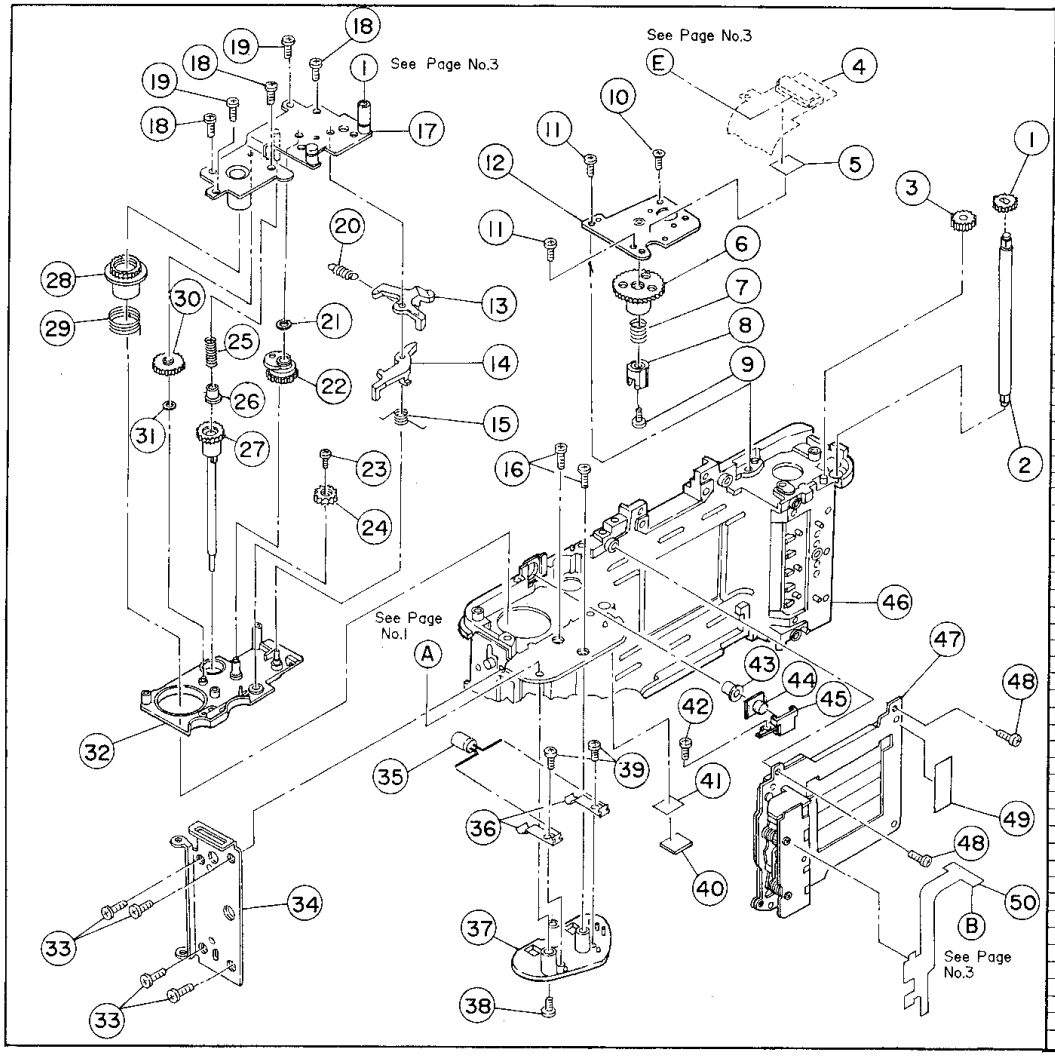
	PARTS NO.	DESCRIPTION	Q'TY
1	168 81510	FC RING SHAFT (1)	2
2	168 81600	FC RING ROLLER (1)	2
3	60442112	FC RING WASHER	2
4	66101525	E RING (E-15)	2
5	168 A4100	L. CONTACT ASS'Y	1
6	61912526	L. CONTACT ASS'Y S.S	2
7	69224576	MIRROR BOX S.S	4
8	168 80600	L. RELEASE LEVER SPRING	1
9	168 23710	LENS RELEASE BUTTON	1
10	168 80310	L. LOCK PIN	1
11	168 80510	L. LOCK PIN SPRING	1
12	*	L. RELEASE LEVER	1
13	66101225	E RING (E-1.2)	1
14	61913526	AF/MF CONTACT BASE S.S	1
15	168 84000	AF/MF CONTACT BASE	1
16	168 83900	L. RELEASE LEVER SHAFT	1
17	168 83700	L. RELEASE LEVER (B)	1
18	168 82700	MIRROR CUSHION	2
19	*	MIRROR BOX	1
20	*	MU BASE PLATE	1
21	168 74500	S. CHARGE LEVER SPRING	1
22	63911628	MU BASE PLATE S.S	2
23	61811828	MU BASE PLATE S.S	1
24	168 75010	S. STOPPER SPRING	1
25	66001010	MU LEVER S.S	1
26	168 73900	MU SPRING	1
27	*	FC BASE PLATE	1
28	61912226	FC BASE PLATE S.S	3
29	61905026	APERTURE PI-FPC ASS'Y S.S	1
30	168 50500	APERTURE PI-FPC ASS'Y	1
31	168 82410	FC DRIVING GEAR SHAFT	1
32	168 82501	FC DRIVING SPRING	1
33	168 82300	FC DRIVING GEAR	1
34	66101225	E RING (E-12)	1
35	168 82110	FC LEVER	1
36	168 82601	FC LEVER RETAINER	1
37	61912226	FC LEVER RETAINER S.S	2
38	168 A4300	FC RING HOLDING PLATE ASS'Y	1
39	61912226	FC RING HOLDING PLATE S.S	2
40	168 83900	L. RELEASE LEVER SHAFT	1
41	168 83800	L. RELEASE LEVER (C)	1
42	168 81400	FC RING	1
43	168 80201	MOUNT PLATE SPRING	1
44	168 80110	BODY MOUNT	1
45	131 17700	BODY MOUNT S.S	4
10-13			
	168 A4200	L. RELEASE LEVER ASS'Y	1
20,21,24-26			
	168 A5300	MU BASSE PLATE ASS'Y	1
27,29,30			
	168 A5600	FC BASE PLATE ASS'Y	1
1-6,8,10-45			
	1AD AB000	MIRROR BOX ASS'Y (See Page No.5)	1

PARTS MARKED * ARE NOT AVAILABLE



	PARTS NO.	DESCRIPTION	Q'TY
1	*	MIRROR BOX	1
2	168 A4800	MB BASE PLATE ASS'Y	1
3	61811828	MB BASE PLATE S.S	2
4	168 70500	45° SPRING	1
5	61916222	FLEXIBLE PLATE SUPPORTER S.S	1
6	66171522	GS RING (GS-15)	1
7	168 70820	SL SPRING	1
8	168 72800	MIRROR SPRING	1
9	137 83400	45° SPRING SHAFT	1
10	168 A4700	M. ADJUSTING PLATE ASS'Y	1
11	63911628	M. ADJUSTING PLATE S.S	1
12	61811828	M. ADJUSTING PLATE S.S	1
13	168 70900	FLEXIBLE PLATE SUPPORTER	1
14	1AD AS000	AF-FPC (S) ASS'Y	1
15	61912228	AF-FPC (S) ASS'Y S.S	3
16	61912026	F. GEAR HOLDER (S) S.S	2
17	168 A3300	F. GEAR HOLDER (S) ASS'Y	1
18	61812526	F. GEAR HOLDER ASS'Y S.S	3
19	168 A3400	F. GEAR HOLDER (L) ASS'Y	1
20	168 83010	F. GEAR	1
21	168 83510	F. GEAR SPRING	1
22	61912526	AF DRIVING MOTOR S.S	2
23	*	AF DRIVING BASE PLATE (A)	1
24	168 75610	AF G2 P3	1
25	168 77010	AF DRIVING BASE PLATE (B)	1
26	168 75810	AF P4	1
27	168 A4500	AF G4 P2 ASS'Y	1
28	1AD 50700	AF P1-FPC ASS'Y	1
29	168 76500	AF P4 FRICTION	1
30	61905026	AF PHOTO INTERRUPTER S.S	1
31	168 76410	AF DRIVING SHAFT	1
32	168 77310	AF G3 SPRING	1
33	168 76310	AF G3	1
34	66101225	E RING (E-12)	1
35	*	DOUBLE STICK TAPE	1
36	168 77100	AF MOTOR DUMPER	1
37	396 10700	BODY LIGHT-PROOF CLOTH	1
38	61913526	AF DRIVING BASE PLATE ASS'Y S.S	2
39	69213076	AF DRIVING BASE PLATE (B) S.S	2
40	169 77200	AF DRIVING MOTOR	1
41	1AD AB400	MIRROR FRAME ASS'Y	1
42	1AD 76100	FLARE PREVENT TAPE	1
43	1AD 71801	MAIN MIRROR	1
44	168 717	MIRROR ADHESIVE TAPE (A)	2
45	168 75900	MIRROR ADHESIVE TAPE (B)	1
46	168 73320	MIRROR LIGHT-PROOF CLOTH	1
16,17,19-21			
	168 A3200	F.GEAR ASS'Y	1
31-34			
	168 A4600	AF G3 ASS'Y	1
22-34,37,39,40			
	1AD AB100	AF DRIVING BASE PLATE ASS'Y	1
1-15,22-34,36-41,46			
	1AD AB000	MIRROR BOX ASS'Y (See Page No.4)	1

PARTS MARKED * ARE NOT AVAILABLE

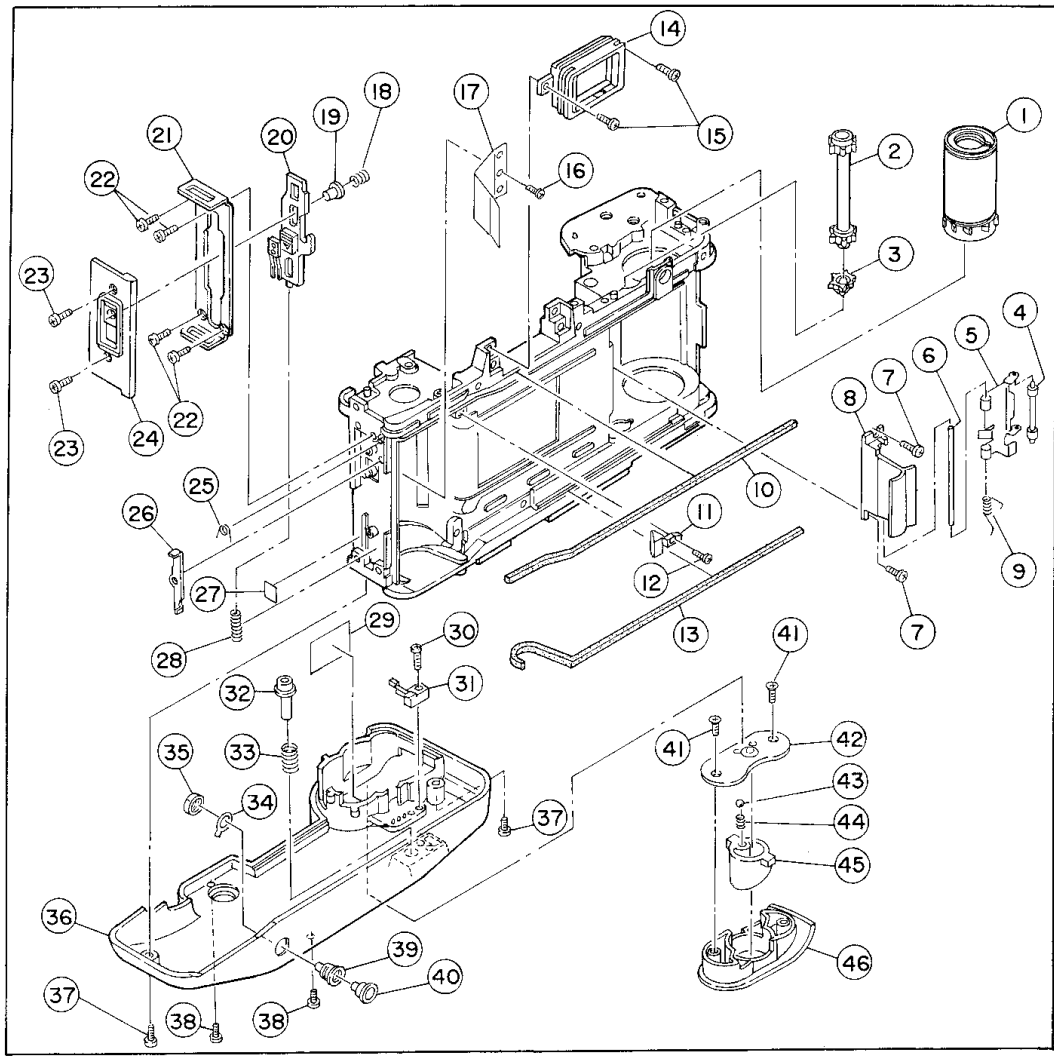


	PARTS NO.	DESCRIPTION	Q'TY
1	168 68300	RW GEAR (2)	1
2	168 68400	RW SHAFT	1
3	168 68200	RW GEAR (1)	1
4	*	AF-FPC (S) ASS'Y(See Page No.5)	1
5	*	DOUBLE STICK TAPE	1
6	168 68500	RW GEAR (3)	1
7	168 68700	RW FORK SPRING	1
8	378 62701	REWIND FORK	1
9	66001042	REWIND FORK S.S	1
10	69313066	REWIND BASE PLAETE UPPER S.S	1
11	69113076	REWIND BASE PLATE UPPER S.S	2
12	*	REWIND BASE PLATE UPPER	1
13	168 66200	CHARGE LEVER	1
14	168 66520	LIMIT LEVER	1
15	168 66900	LIMIT LEVER SPRING	1
16	69114076	BATTERY CONTACT BASE S.S	2
17	*	WINDING BASE PLATE UPPER (B)	1
18	69113076	WINDING BASE PLATE UPPER (B) S.S	3
19	69113076	WINDING BASE PLATE UPPER ASS'Y S.S	2
20	168 66600	CHARGE LEVER SPRING	1
21	60113110	WASHER	1
22	168 65320	DOUBLE WINDING PREVENTION GEAR	1
23	66001042	W. SHAFT GEAR (2) S.S	1
24	168 65200	W. SHAFT GEAR (2)	1
25	340 61600	SPROCKET SPRING	1
26	168 65600	SPROCKET GEAR RETAINER	1
27	168 65410	SPROCKET GEAR	1
28	168 65911	SPOOL GEAR	1
29	168 66000	SPOOL FRICTION SPRING	1
30	168 65800	SPOOL IDLE GEAR	1
31	60112410	WASHER	1
32	*	WINDING BASE PLATE UPPER (A)	1
33	69113076	BACK COVER HINGE PLATE S.S	4
34	168 11120	BACK COVER HINGE PLATE	1
35	ECERIA22101	*19 ELECTROLYTIC-CAPACITOR	1
36	1AD 12200	BATTERY CONTACT	2
37	1AD 12100	BATTERY CONTACT BASE	1
38	69115576	TOP COVER S.S	1
39	69112576	BATTERY CONTACT S.S	2
40	1AD AE140	CONSTANT-VOLTAGE IC BOARD ASS'Y	1
41	*	DOUBLE STICK TAPE	1
42	69114076	AE LOCK CASE S.S	1
43	1AD 12500	AE LOCK BUTTON	1
44	1AD 12700	AE LOCK SWITCH	1
45	1AD 12610	AE LOCK CASE	1
46	*	BODY	1
47	1AD 25000	SHUTTER	1
48	69123066	SHUTTER S.S	2
49	CP 5.0	IC TAPE (BLACK)	1
50	169 50300	FPC-S	1
6-9,12			
	1AD AA200	REWIND BASE PLATE UPPER ASS'Y	1
13-15,17,18,20-22,25-32			
	1AD AA400	WINDING BASE PLATE UPPER ASS'Y	1

PARTS MARKED * ARE NOT AVAILABLE

1AD

No.7

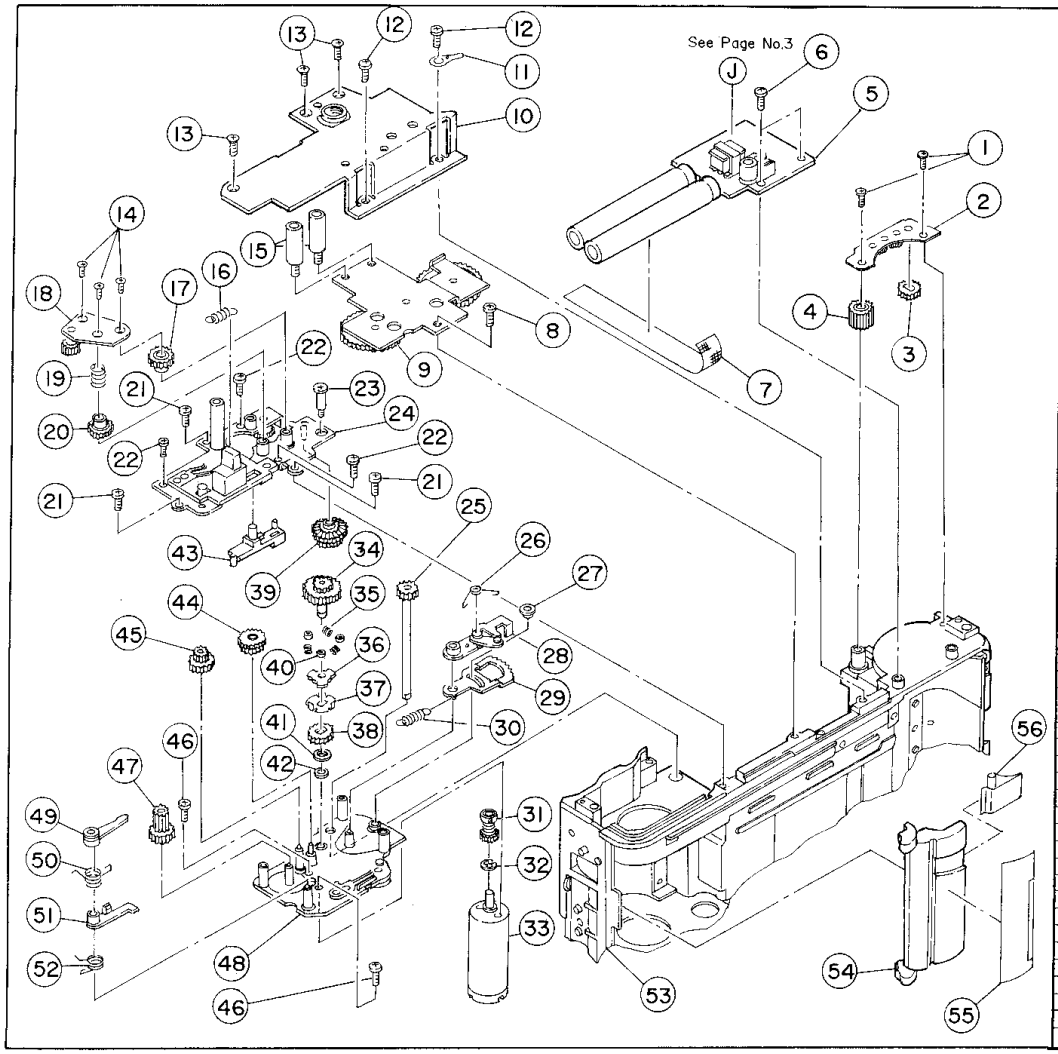


	PARTS NO.	DESCRIPTION	Q'TY
1	169 A2000	SPOOL ASS'Y	1
2	168 65512	SPROCKET	1
3	168 67400	P. SWITCH RING	1
4	174 43900	FILM GUIDE ROLLER	1
5	174 44020	FILM GUIDE HOLDER	1
6	174 44100	FILM GUIDE HOLDER SHAFT	1
7	69113576	FILM GUIDE HOLDER ASS'Y S.S	2
8	168 10520	SPROCKET COVER	1
9	174 44730	FILM GUIDE SPRING	1
10	168 10800	BODY LIGHT-PROOF MOQUETTE	1
11	5BD 22500	CARTRIDGE GUIDE	1
12	69114579	CARTRIDGE GUIDE S.S	1
13	168 11200	BODY LIGHT-PROOF MOQUETTE LOWER	1
14	173 20510	EYE-PIECE FRAME	1
15	69113576	EYE-PIECE FRAME S.S	2
16	69115579	CARTRIDGE HOLDER SPRING S.S	1
17	168 10611	CARTRIDGE HOLDER SPRING	1
18	168 15610	BACK COVER LOCK BUTTON SPRING	1
19	168 15412	BACK COVER RELEASE BUTTON	1
20	168 A1400	BACK COVER RELEASE ASS'Y	1
21	168 10710	STRAP HOLDER	1
22	69124076	STRAP HOLDER S.S	4
23	69215579	LOCK PLATE COVER S.S	2
24	168 15800	LOCK PLATE COVER	1
25	168 16400	BACK COVER LOCK LEVER SPRING	1
26	168 16300	BACK COVER LOCK LEVER	1
27	168 72101	SM ADHESIVE TAPE	1
28	168 15510	BACK COVER LOCK SPRING	1
29	1AD 19500	BATTERY SEAL	1
30	69113566	BATTERY SWITCH S.S	1
31	1AD 12300	BATTERY SWITCH	1
32	1AD 17220	R. BUTTON	1
33	1AD 16900	R. BUTTON SPRING	1
34	132 41210	SOCKET TERMINAL	1
35	233 12000	PLUG NUT	1
36	*	BOTTOM COVER	1
37	69115579	BOTTOM COVER S.S	2
38	61912529	BOTTOM COVER S.S	2
39	168 A3000	R. SOCKET ASS'Y	1
40	139 16500	RELEASE SOCKET CAP (S)	1
41	69313072	BATTERY COVER KNOB PLATE S.S	2
42	1AD 19800	BATTERY COVER KNOB PLATE	1
43	66702020	STEEL BALL (20ø)	1
44	1AD 19900	BATTERY COVER KNOB SPRING	1
45	1AD 19700	BATTERY COVER KNOB	1
46	1AD 19600	BATTERY COVER	1
4-6,8,9			
	168 A3100	FILM GUIDE HOLDER ASS'Y	1
30,31,34-36,39			
	1AD AD500	BOTTOM COVER ASS'Y	1
41-46			
	1AD AD700	BATTERY COVER ASS'Y	1

PARATS MARKED * IS NOT AVAILABLE

1AD

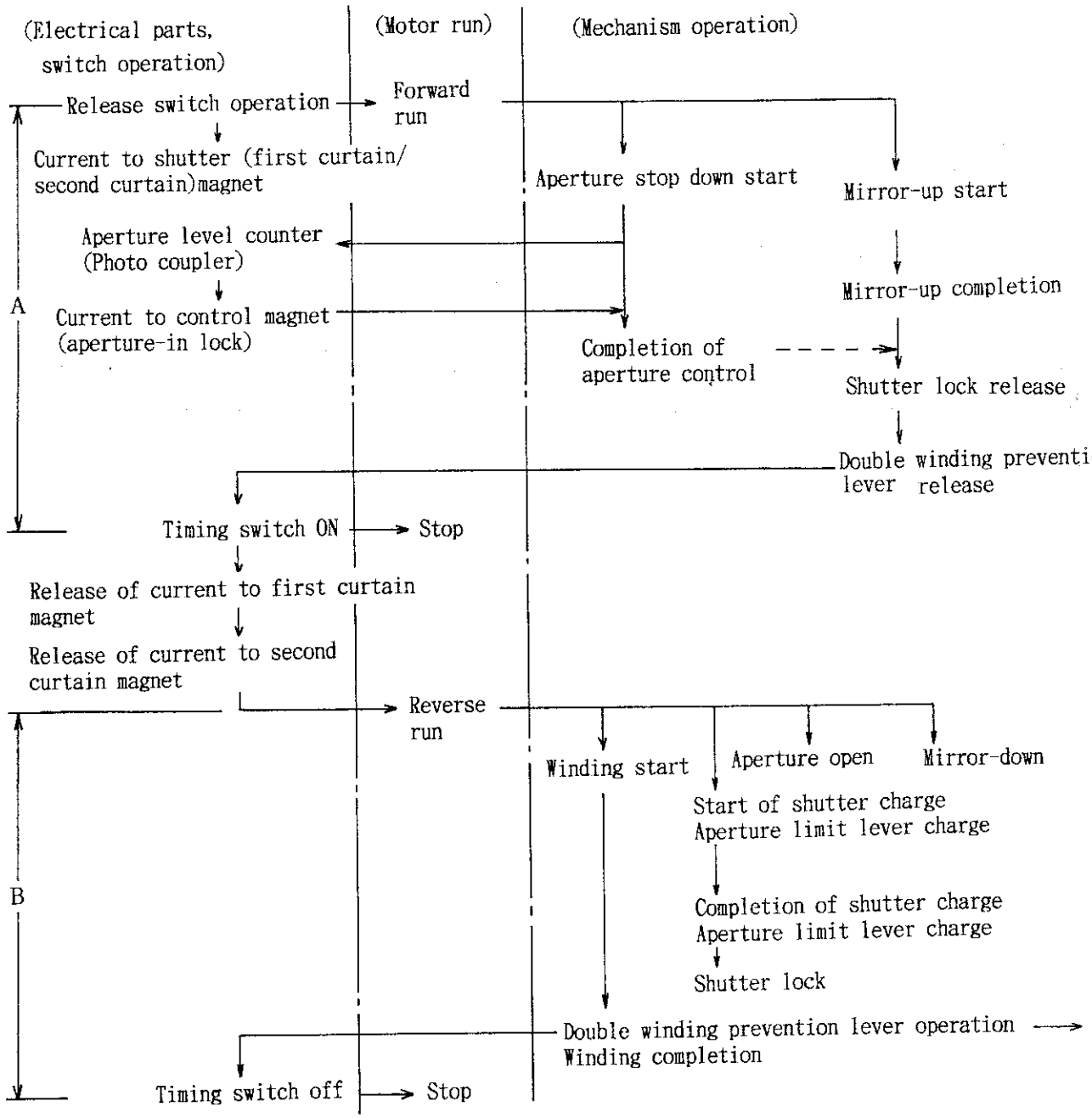
No.8



	PARTS NO.	DESCRIPTION	Q'TY
1	69113076	REWIND BASE PLATE S.S	2
2	1AD AA100	REWIND BASE PLATE LOWER ASS'Y	1
3	168 68300	RW GEAR (2)	1
4	168 68800	RW GEAR (S)	1
5	1AD AE180	FLASH P.C BOARD ASS'Y	1
6	69114076	FLASH P.C BOARD ASS'Y S.S	2
7	*	ACETATE CLOTH TAPE	1
8	69113076	RW GEAR BASE PLATE ASS'Y S.S	1
9	1AD AE800	RW GEAR BASE PLATE ASS'Y	1
10	1AD AD300	TRIPOD SOCKET BASE PLATE ASS'Y	1
11	3AQ 12900	MINUS LUG PLATE	1
12	69124576	TRIPOD SOCKET BASE PLATE S.S	2
13	61823526	TRIPOD SOCKET BASE PLATE S.S	3
14	61802526	WINDING BASE PLATE LOWER (C) S.S	3
15	1AD 19011	TRIPOD SOCKET BASE PLATE SHAFT	2
16	168 69120	RW PLATE SPRING	1
17	168 64510	RW GEAR (LEFT)	1
18	168 A2600	WINDING BASE PLATE LOWER (C) ASS'Y	1
19	168 63210	CL GEAR SPRING	1
20	168 63021	CL GEAR	1
21	69113076	WINDING BASE PLATE LOWER ASS'Y S.S	3
22	69113076	WINDING BASE PLATE LOWER (B) S.S	3
23	168 63300	WINDING BASE PLATE LOWER ASS'Y S.S	1
24	*	WINDING BASE PLATE LOWER (B)	1
25	168 A1800	W SHAFT ASS'Y	1
26	168 64420	RATCHET ARM SPRING	1
27	168 63610	SECTOR RETAINER	1
28	168 A1900	SECTOR ASS'Y	1
29	168 63900	SECTOR GEAR	1
30	168 63500	SECTOR GEAR SPRING	1
31	168 A1710	WINDING MOTOR FRICTION ASS'Y	1
32	66101025	E RING (E-10)	1
33	168 69600	WINDING MOTOR	1
34	*	CLUTCH GEAR	1
35	137 34010	ROLLER SPRING	3
36	168 69400	WINDING CLUTCH PLATE	1
37	137 34100	ROLLER HOLDER PLATE	1
38	168 62911	CLUTCH GEAR (C)	1
39	168 67200	B GEAR	1
40	137 33900	CLUTCH ROLLER	3
41	60301812	CLUTCH WASHER	1
42	66101225	E RING (E-12)	1
43	168 69220	RW RELEASE BUTTON	1
44	168 A1610	REDUCTION GEAR (3) ASS'Y	1
45	168 62500	REDUCTION GEAR (2)	1
46	61913526	WINDING MOTOR S.S	2
47	168 62410	REDUCTION GEAR (1)	1
48	*	WINDING BASE PLATE LOWER (A)	1
49	168 61210	R. CHANGE HOOK	1
50	168 61520	RW LOCK LEVER (2) SPRING	1
51	168 61410	R. CHANGE RELEASE LEVER	1
52	168 61310	RW LOCK LEVER (1) SPRING	1
53	*	BODY	1
54	168 10210	FILM COVER	1
55	168 16000	FILM LOADING SEAL	1
56	168 15900	FILM GUIDE	1
14,16-20,22,24-52	1AD AA300	WINDING BASE PLATE LOWER ASS'Y	1
34-38,40-42	168 A2300	CLUTCH GEAR ASS'Y	1

PARTS MARKED * ARE NOT AVAILABLE

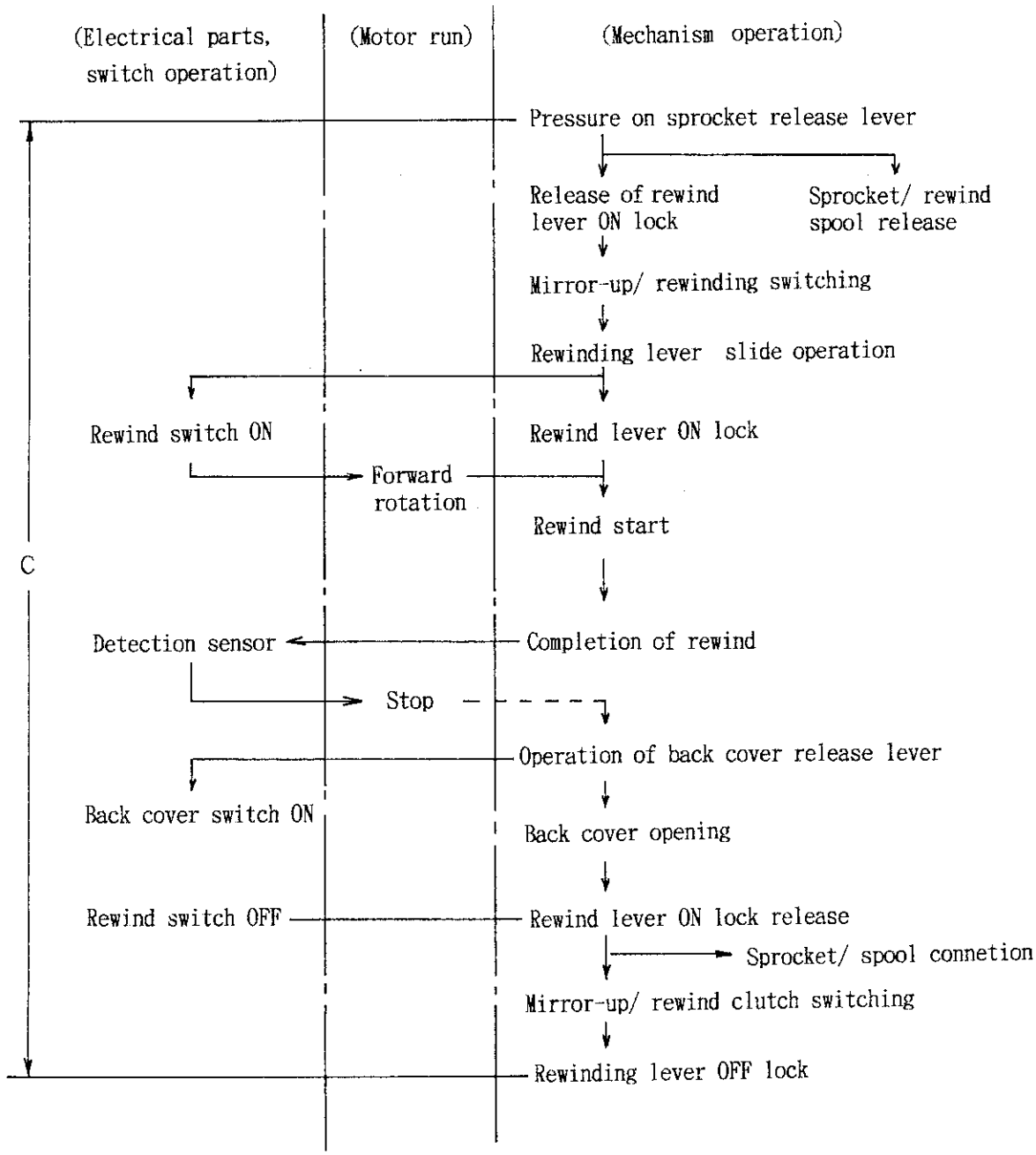
[Mirror-up and winding sequence]



*A:The turning on of the release switch sets off the forward run of the sequence motor, which drives the mirror-up mechanism and controls the lens aperture. And the sequence motor comes to a stop when the timing switch is turned on.

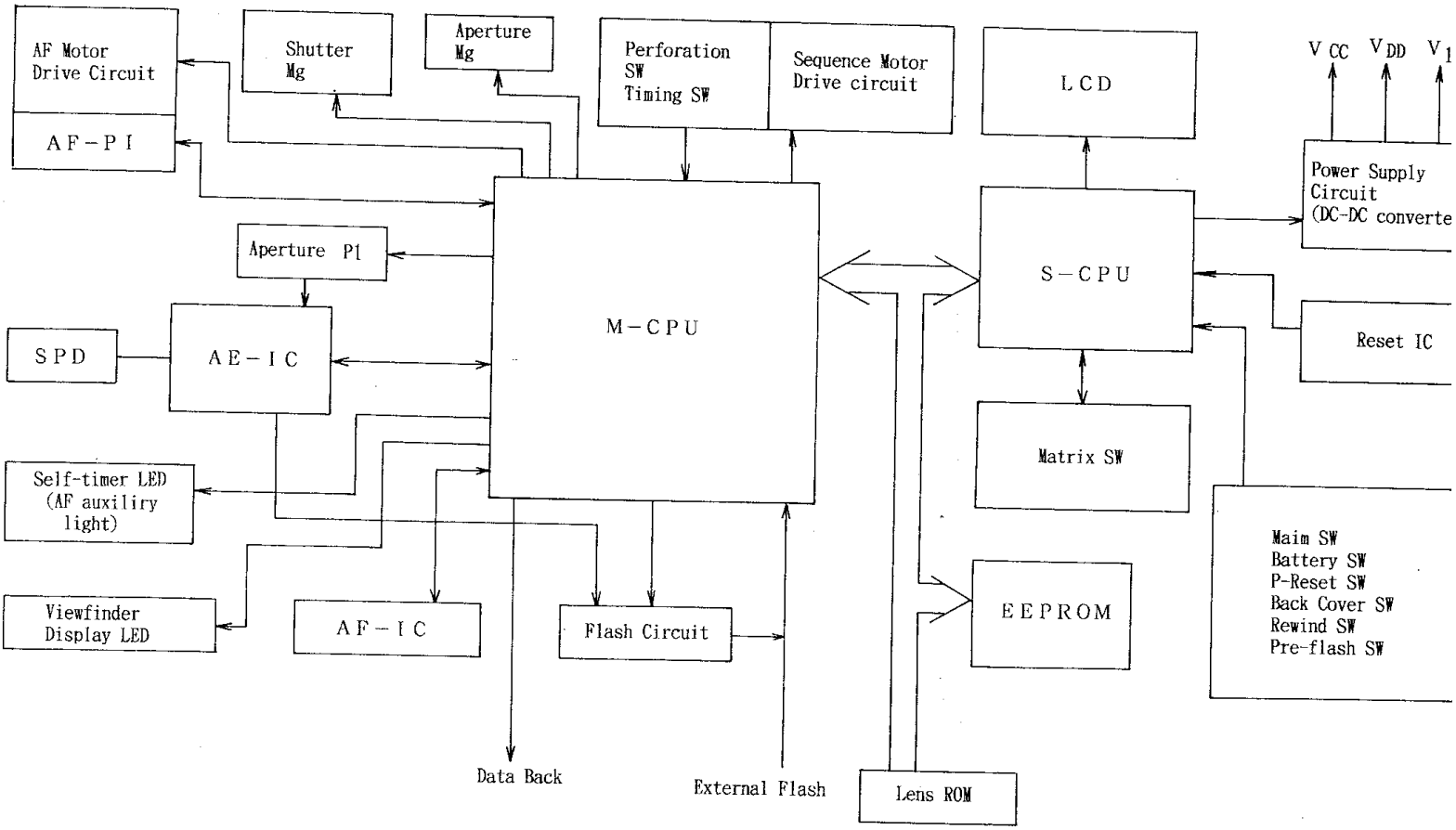
*B:After shutter operation, the sequence motor starts reversing and the mechanism interlocked with the motor performs winding, shutter charge and aperture Mg charge as well as mirror-down and aperture opening.

[Rewind sequence]



*C:Press of the sprocket release lever releases the sprocket, spool and rewind lever ON lock. When the rewind lever is slided, the rewind switch turns on. Then the sequence motor starts running forward and the interlocked mechanism starts rewinding.
The sequence motor stops when the completion of rewind is detected.
Operation of the back cover release lever turns on the back cover switch. when the back cover is open, the rewind lever ON look is released and the rewind switch is turned off.

ELECTRONIC CIRCUIT BLOCK DIAGRAM



ELECTRONIC CIRCUIT

(1) Circuit Constitution

The electronic circuit consists of the Main CPU, which executes multiple-mode, high-level control and calculation, and nine ICs.
The Main CPU performs sequence control, AE control, AF control and flash control, operating at such a high clock as 12 MHz.
The Sub-CPU performs detection of various operating button switches, control of the liquid crystal panel displays and power supply control.
When about 16 seconds have passed with the camera not operated, the main power is automatically turned off for power saving. In this status, the camera consumes little electricity, so that the user does not need to be nervous about turning off the main switch.
Also the exposed frame No., exposure mode, drive mode, shutter speed setting and aperture stop down value are stored in the EEPROM, which does not require a backup battery. And the status before the power-off is restored when the main power turns on as a result of user's operation of any switch.
The camera communicates electrically with the IC inside the mounted lens for the lens information, such as aperture full open F value, aperture stop down value, focal length and shooting distance. The communication of these data between ICs is performed on a serial communication line under the control by the Main CPU.
The light metering sensor measures the brightness of the subject at the center and the periphery of the view and sends the logarithmically compressed values to the analog processing IC. This IC processes the light metering data to correct the effects of temperature and those of the light source varying with time like a fluorescent light and then sends the corrected light metering data to the Main CPU.
The AF IC is controlled by the Main CPU. The Main CPU receives the information about the subject from the AF sensor and calculates the deflection from the focus, the direction of focusing, contrast and the optimal drive speed to control the AF motor.
The operation speed of the AF motor is detected by the AF encoder and fed back to the CPU, which controls the AF motor to assure its running at the best speed.
The built-in flash, whose guide number is 11, is controlled by the same CPU-matic system as in 230AF/200AF. From the lens information and the mode setting by the user, the optimal aperture stop down value is calculated by the Main CPU to control the aperture.
This system, irrespective of the size and reflectivity of the subject, permits not only correct exposure control but only the full use of flash capacity. Therefore, the system is best suited for use with a relatively small flash. In the pre-flash mode to minimize red-eye effect, flash of guide number of about four is fired prior to shooting. Shutter speed, aperture stop down value, AF value, etc. are automatically adjusted and the adjusted data, converted to digital values, are transferred through the communication line and stored in the camera. The camera uses least number of adjustments by semifixed resistances to assure the high reliability.

(2) Function of Blocks

[Reset IC] (IC-8) V_B drive

Input : V_B
Output : Reset signal
Function : When V_B is 3.7V or below, this IC outputs reset signal to the reset terminal of S-CPU.

[DC-DC converter] V_B drive

Input : V_B
Power hold control signal
Output : V_{DD}, V_{CC}, V_{12}
Functions : Outputs V_{DD}, V_{CC}, and V_{12} when PH terminal is in "L".
Stops outputing V_{DD}, V_{CC} and V_{12} when PH terminal is in "H".

[S-CPU] (IC-2) V_{CC} drive

Input : Reset signal (from Reset IC)
SW input
°Input by matrix:
(Check,Release, Mode, Drive, Up, Down, AE Lock, AF Lock, Exposure Compensation, Focus Range)
°Independent input:
(Main, Battery Cover, P-Reset, Back Cover opening & closing, Rewind, Pre-flash)

Output : Power control signal
LCD display signal
Matrix SW read signal
M-CPU reset signal

Functions : Power control (DC-DC converter output control by PH output terminal)
SW input read accompanied by power ON & hold
LCD control
Control of write in/read EEPROM (serial communication)
Communication with M-CPU (serial communication)
Adjustment function

[M-CPU] (IC-1) V_{DD} drive

Input : Timing SW, perforation SW
Pop-up SW
Pre-flash SW
Aperture pulse
Lens drive pulse
Light metering result output signal (from AE-IC)
Distance metering result output signal (from AF-IC)
Flash charge completion signal
Battery check level

Output : Light metering control signal
AF-IC control signal
Aperture Mg control signal
AF motor control signal
Sequence motor control signal

Flash charge control signal
Date imprinting signal

Functions : Lens ROM data read (serial communication)
AF-IC control (AF calculation, predictive AF calculation)
AF motor drive IC control
Light metering control (light metering calculation)
Flash control
Sequence motor drive IC control (mirror-up, winding, rewinding)
Aperture Mg control
Shutter Mg control
Battery level check
Accessory control (external flash, data back)

[EEPROM] (IC-5) V_{DD} drive

Functions : Memory of camera status information (film counter status, mode setting, set values, etc.)
Memory of adjusted values

[AE-IC] (IC-3) V_{DD} drive

Input : Light metering control signal (SP, Ave/Spot switching)
SPD output
Aperture photo interrupter output
V_B monitoring voltage during flash charge

Output : Light metering output (LAD)
Aperture pulse signal
A-D reference voltage (Vref)
Flash charge stop signal

Functions : Light metering by SPD, and light metering signal output
Correction of waveform of aperture photo interrupter
Prevention of voltage drop caused by flash charge

[AF-IC] (IC-4) V_{DD}, V_{12} drive

Input : Reset signal (AF-RESET)
Sensor/monitor switching signal (O/M SELECT)
Accumulation control signal (ϕCG, AGC1, 2, 3)
Data transfer control signal (ϕTG, ϕTR)
Analog system reference voltage (V_{ZD}, V_{MAJ})

Output : Accumulation signal and accumlation level monitor output (ϕCH, V_{OUT})
Distance metering result and transfer control signal (V_{OUT}, ϕAD)

Function : Accumulation of electric charges to which light of image in target is converted
Accumulation level monitor output
Transfer and output of the above-mentioned charges received by CCD (equivalent to 128 elements)

[Flash Circuit] V_B drive

Input : Flash charge control signal
Flash charge stop signal
Pre-flash signal
Flash signal (X)

Output : Flash charge completion signal

Functions : Oscillation, flash charge (lower part of body)
Flash (above penta prism)

[AF Motor Drive IC] (IC-6) V_B , V_{DD} drive

Input : IN1, IN2

Output : OUT1, OUT2 (Output at both ends of motor)

Functions :

IN1	IN2	Status
"L"	"L"	Free
"H"	"L"	Counterclockwise turning of coupler
"L"	"H"	Clockwise turning of coupler
"H"	"H"	Brack

[Sequence Motor Drive] V_B drive

Input : Forward run (in direction of winding) signal,
Reverse run (in direction of mirror-up) signal, Brake signal

Output : Output at both ends of motor

Function : Forward run, reverse run and brake of sequence motor

(3) Operation

Booting by main battery operation

The reset IC gives reset signal to S-CPU until Vcc exceeds 3.7V.
Vcc is being supplied and S-CPU is always operating as long as the main battery is operating.

"Power-OFF" status:

The main switch is off or 16 seconds have passed without any operation causing power-on with the main switch turned on.

S-CPU operates at 32KHz clock.
LCD indicates partial display (display at power-off).
S-CPU outputs "H" to the PH terminal of the DC-DC converter to turn off the output V_{DD}, Vcc and V_{12}.
No other devices operate.

"Power-ON" status:

With the main switch turned on, operation causing power-on is being performed or 16 seconds have not passed after the end of such operation.

S-CPU operates at 4MHz clock.
LCD indicates whole display (display at power-on).
S-CPU outputs "L" to the PH terminal of the DC-DC converter, which outputs V_{DD}, Vcc and V_{12}.
AF-IC and AE-IC operate under the control by M-CPU.
These ICs perform distance metering and lights metering, respectively.
LED displays inside the viwfinder light up.
M-CPU reads lens ROM data periodically.
Flash charge control is performed at built-in flash pop-up.

Check SW: ON

The auxiliary light comes on, when necessary.
The LED of AF-PI lights up before lens drive and goes out after the drive.

Release SW: ON

In self-timer mode, the Self-timer LED (used also for AF auxiliry light) blinks.
The LED of the aperture PI lights up and then the sequence motor is reversed and mirror-up is started.
The output waveform from the aperture PI is corrected by AE-IC and it is input to M-CPU.
M-CPU observes the aperture pulse and activates the aperture Mg to perform aperture control.
M-CPU detects the completion of mirror-up by observing the operation of the timing switch. (SW: ON)
Upon completion of mirror-up and aperture stop down, the shutter Mg is turned off to control the shutter.

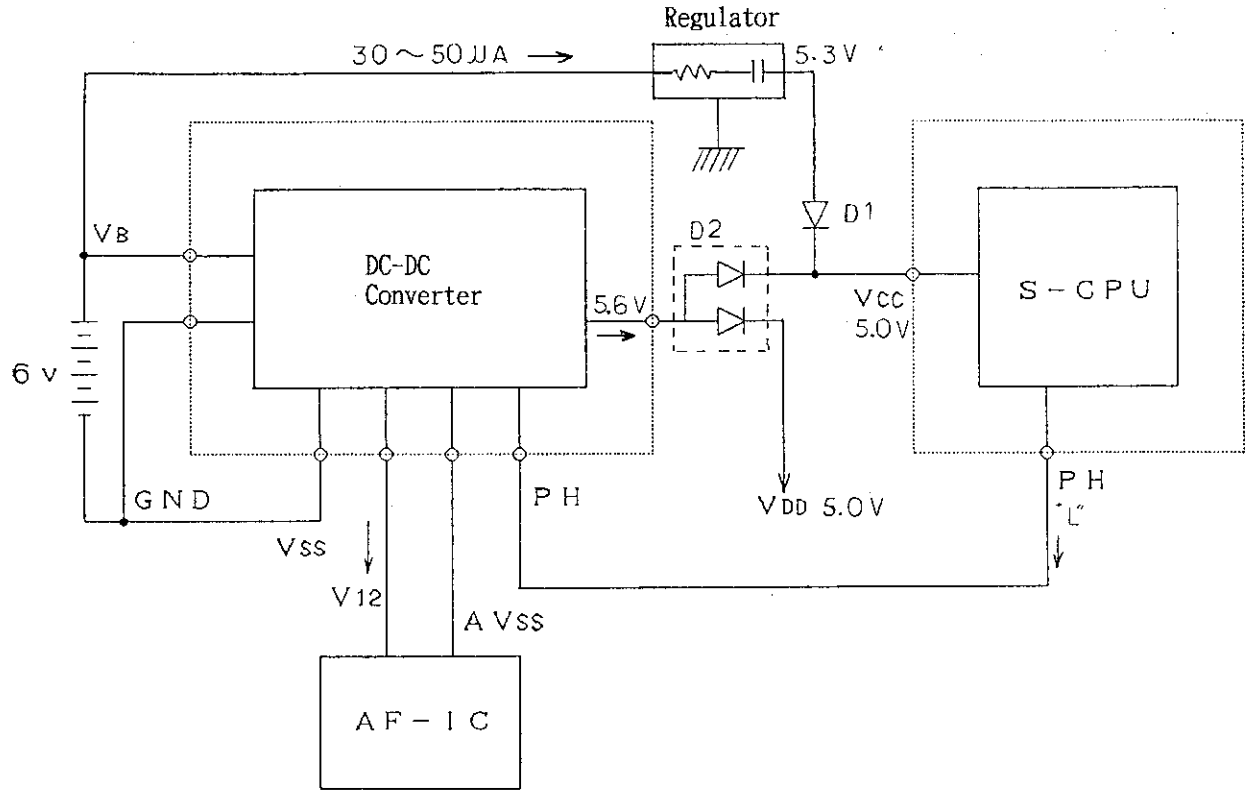
After completion of the travel of the shutter second curtain, the sequence motor runs forward to perform film winding (observed by perforation switch), aperture opening and shutter charge.
The timing switch is observed, and the motor is stopped when the timing switch turns off.

Switching of power ON to OFF

M-CPU stops all its control and informs S-CPU that it is ready for power-off.
S-CPU writes the information about the change in status during power-on in EEPROM.
"H" is output to the PH terminal of the DC-DC converter to stop the output V_{DD}, Vcc and V_{12}.
The operation of S-CPU is changed from 4MHz clock to 32KHz clock.

POWER SUPPLY CIRCUIT

In the "power-off" status, the voltage from the battery, dropped to Vcc via a resistance and diode, is being applied to S-CPU.
In this low power consumption mode, S-CPU performs only the display on the LCD panel. When a port affecting the power-on of S-CPU turns "L", S-CPU enters in normal mode and outputs "L" as a PH signal, which starts the DC-DC converter. The DC-DC converter outputs 5.4 to 6.2V at Vdd terminal when the battery voltage is 2.3 to 7V. S-CPU gives "L" to the reset terminal of M-CPU until the voltage Vdd becomes stable. When S-CPU cancels the reset status, M-CPU starts operating.
Vdd is connected to Vcc via diodes, and Vdd and Vcc show the same voltage in the "power-on" status. Besides Vdd, the DC-DC converter outputs 12V, which is supplied to AF-IC.



BATTERY CHECK CIRCUIT

The battery check circuit operates when the PH signal is "L", that is, the electronic system is in the "power-on" status. The battery voltage is subjected to resistance division, and the divided voltage is read in the A-D conversion port of M-CPU.

The timing for read is:

① Immediately after power-on
② Immediately before mirror-up start
③ Immediately before winding start
④ Immediately after rewind start

At ① or ②, the motor is turned on in the direction of winding for 1 ms to apply load to the battery and the voltage is read.

At ③, the motor is turned on in the direction of mirror-up for 1 ms to apply load to the battery and the voltage is read.

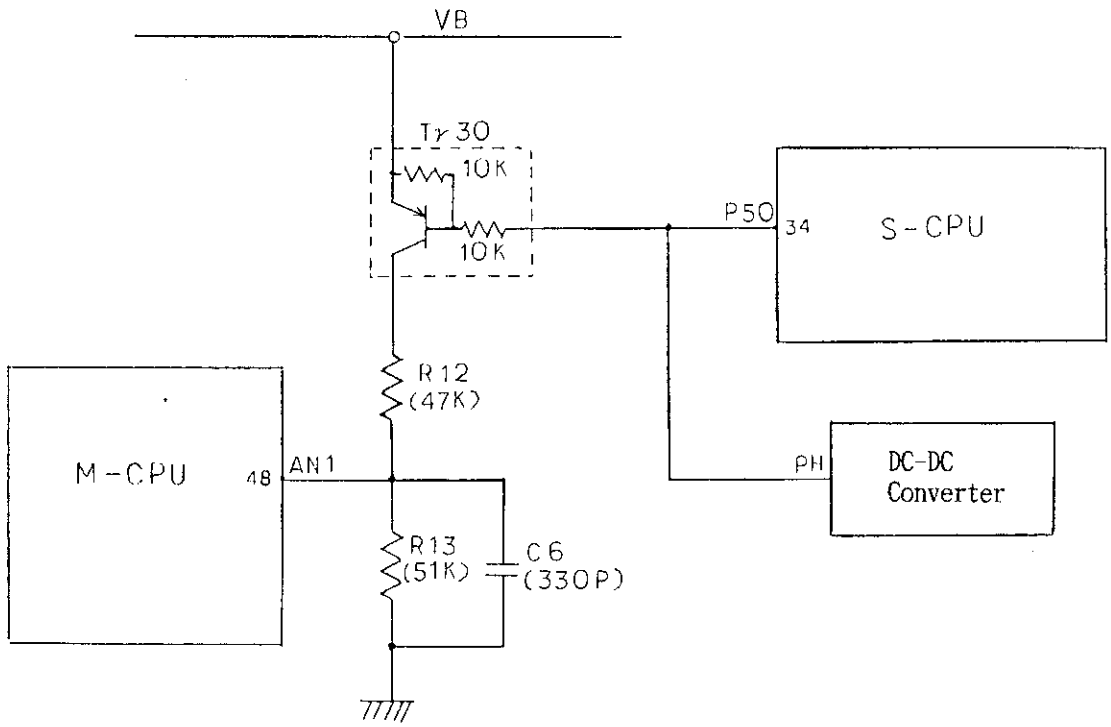
At ④, voltage is read 1 ms after rewind start.

Depending on the read voltage, the result of battery check is as follows:

About 4.1V : Normal

3.9 to 4.1V : Alarm (B1)

Below 3.9V : Operation inhibited



AE CIRCUIT

1.Photometry------AE-IC, SPD

The analog circuit for light metering consists of the same AE-IC and SPD as SAMURAI X 3.0 and SAMURAI X 4.0. The analog circuit sets the reference voltage (V_R -V_S) and performs analog calculation in the reference voltage range.

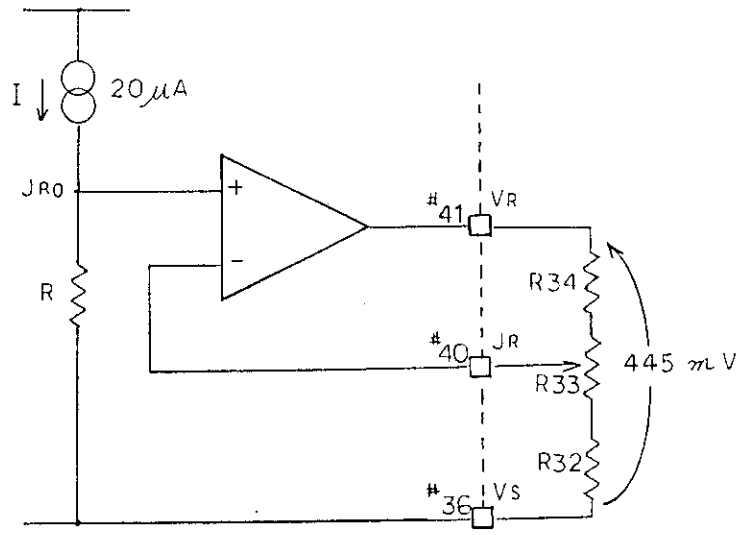
1)Reference Voltage V_S -----V_S=1.2V (Vcc=5.0V, Ta=25°C)

AE-IC incorporates a voltage regulator circuit.
The reference voltage V_S is 1.2V.

2)Reference voltage V_R -----445mV higher than Vs (Vcc=5.0V, Ta=25°C)

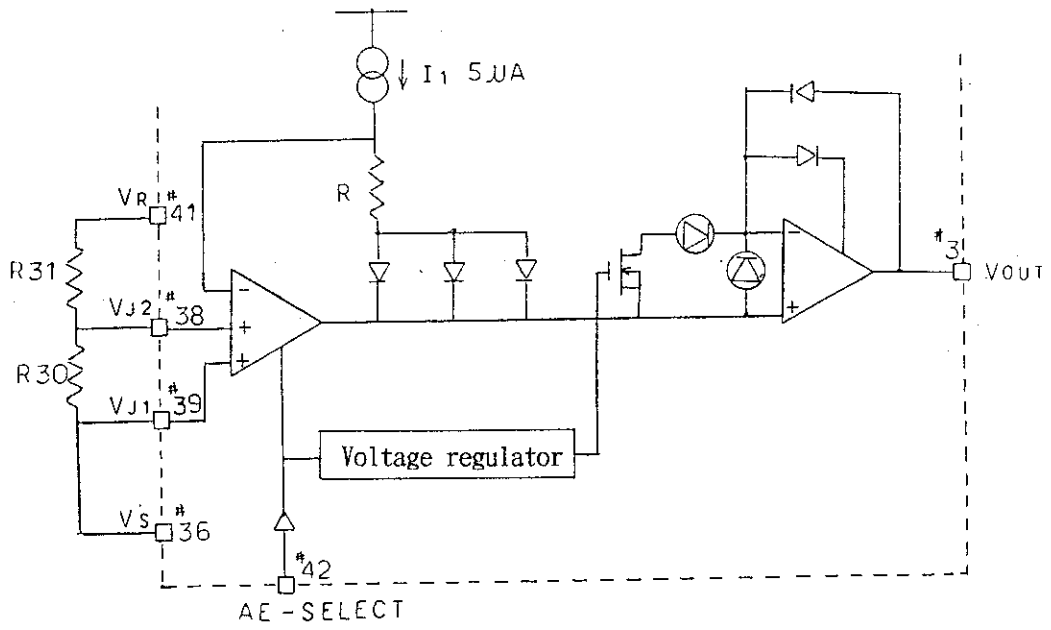
In photometric calculation, a change of 1EV corresponds to a change of 18mV and there are 2 steps.
Therefore, adjust V_R -V_S=445mV

Caution: Adjust V_R -V_S carefully, which varies with the temperature.



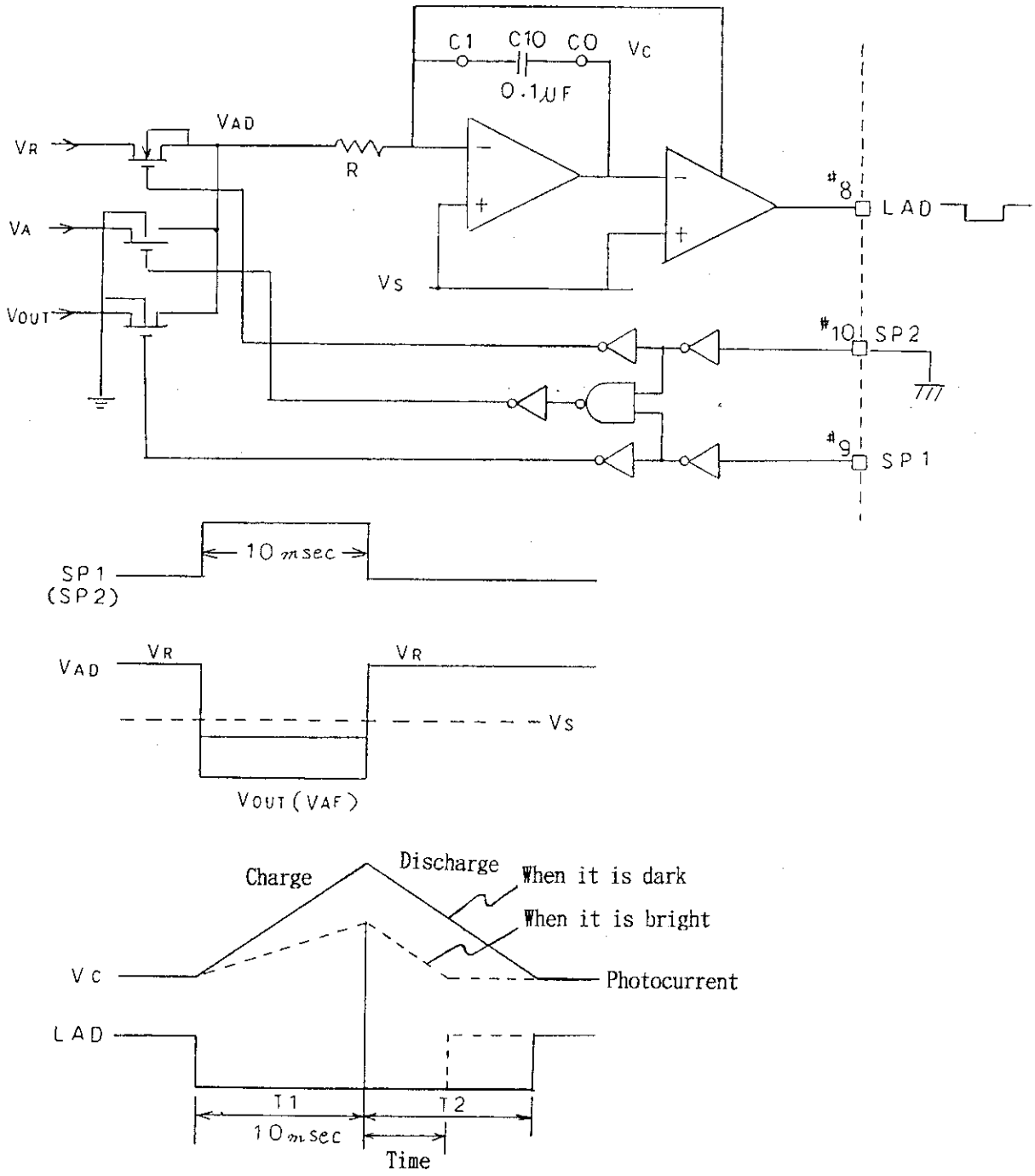
3)Light Metering Calculation Section

The photometric amplifier changes the photoelectric current from the photodiode SPD into a voltage thrugh logarithmic compression. A one-step variation in brightness doubles (or halves) the photoelectric current from the photodiode wheras the output of the photometric amplifier changes in 18mV steps. (Vcc=5.0V, Ta=25°C)



A one-stop (1EV) change in brightness causes an 18mV change in the photometric output Vout.
Photometric adjustment is made by software, so that the voltages V_{J1} and V_{J2} are produced with R30 and R31 as fixed resisters.
And each completed camera is given necessary photometric adjustment by writing the compensation data of AE within the above-mentioned range of compensation values.

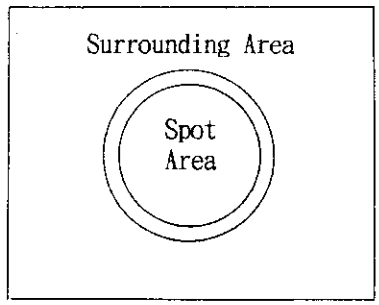
4)Photometry A-D Converter - - - - Dual-slope integration



The voltage of V_{AD} is switched like $V_{OUT} \longrightarrow V_R$ and $V_{AF} \longrightarrow V_R$ by SP1 to change and discharge the capacitor C10 and convert the voltage into the time.

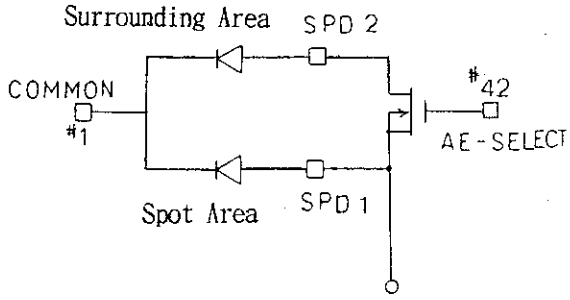
5)Photo-diodes SPD

As shown at right, the photo-diodes SPD are assigned for light detection of the spot area and the surrounding area. There are nonsensible area of 200 μm between the two areas.



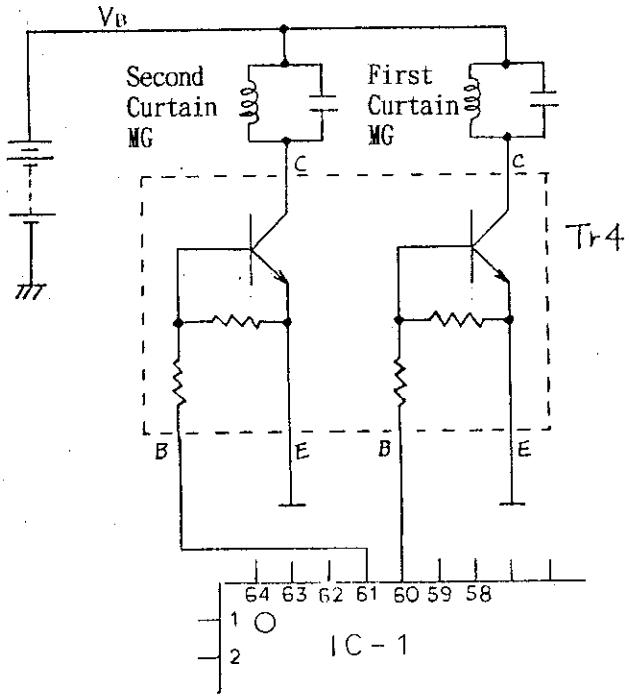
For average metering, the "spot area + surrounding area" is used. For spot metering, the spot area only is used. Switching between the Ave. and the spot-mode metering is done by the AE-SELECT signal, which switches the FET.

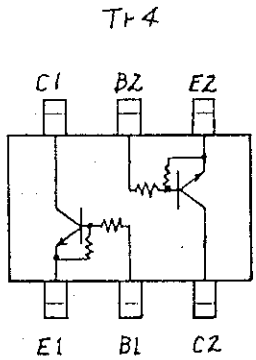
AE-SELECT----- "L" ⟶ Ave metering
AE-SELECT----- "H" ⟶ Spot metering

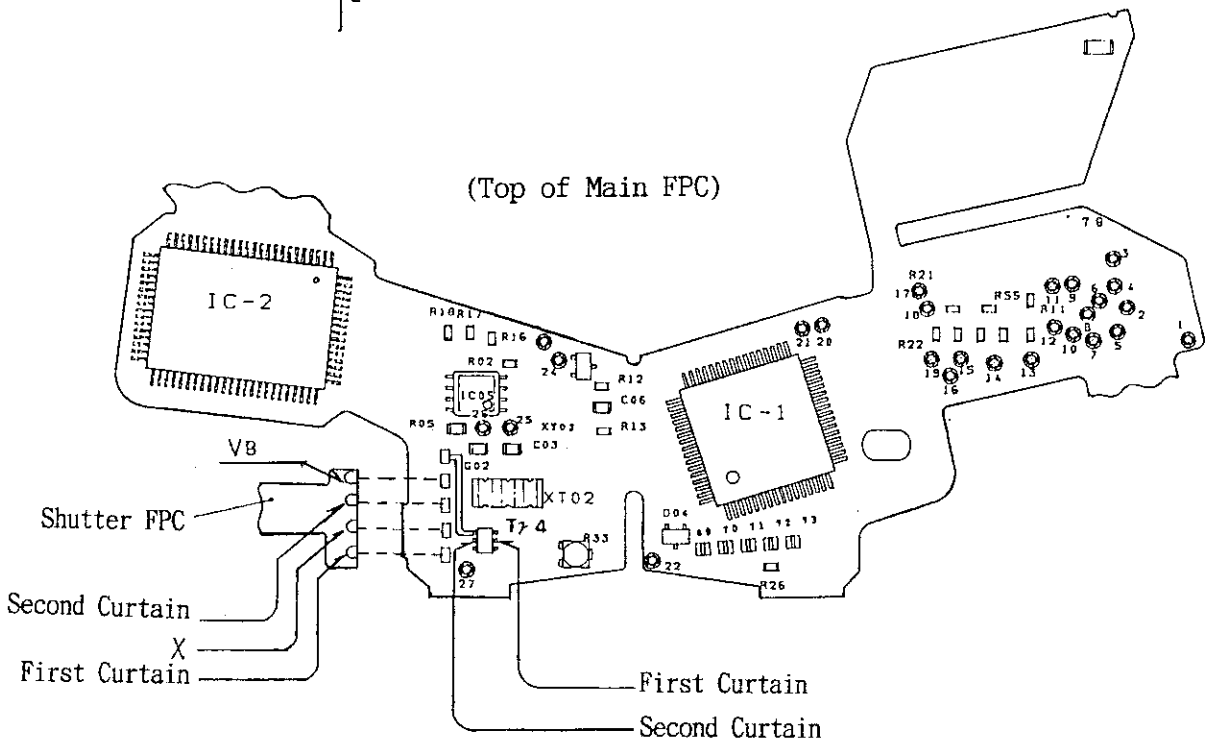


SHUTTER CONTROL

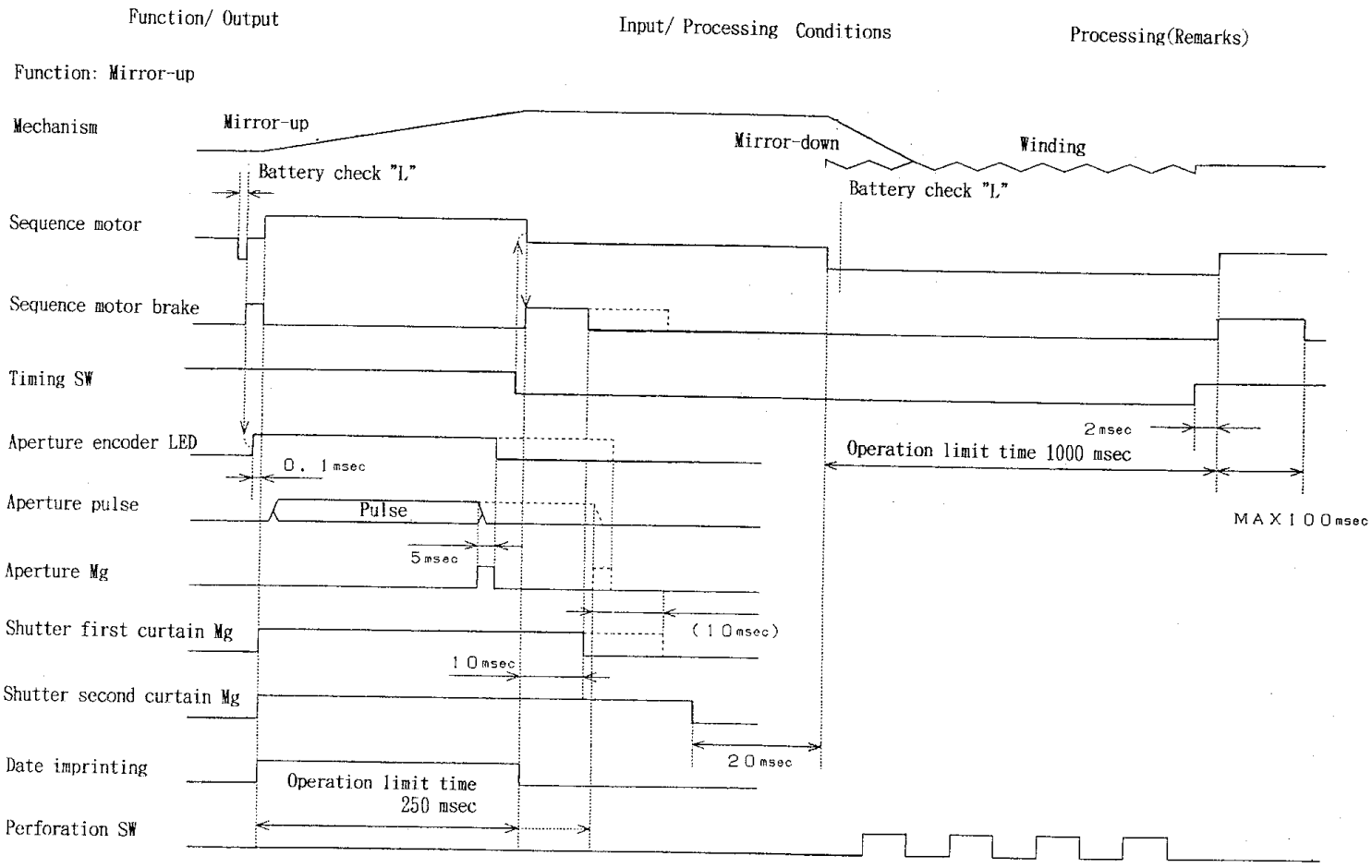
The first and second curtains of the shutter is controlled with magnets.
When IC-1#60 turns "L", Tr4 turns on to control the first curtain.
When IC-1#61 turns "L", Tr4 turns on to control the second curtain.
For shutter control, 1EV is divided into eight steps.







SHUTTER SEQUENCE



SEQUENCE MOTOR DRIVE CIRCUIT

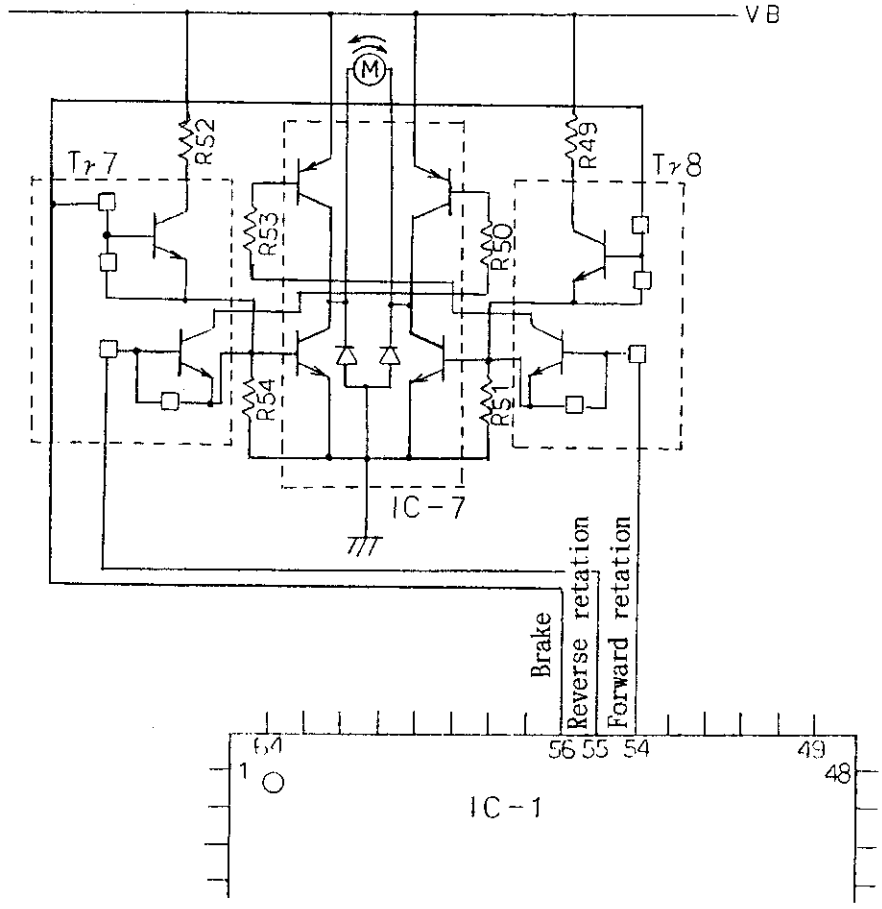
The sequence motor drive circuit consists of Tr7, Tr8 and IC-7 to control the forward and reverse rotation electrically.
The sequence motor is controlled by IC-1.
Control signals are output from #54 for mirror-up/rewinding, #55 for winding/ battery check and #55 for brake.

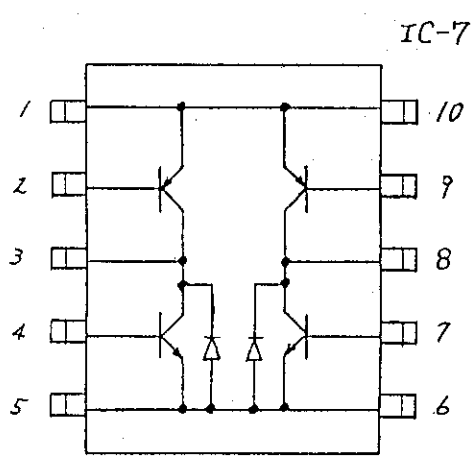
Drive direction	#54	#55	#56
OFF	L	L	L
Forward rotation	H	L	L
Reverse rotation	L	H	L
Brake	L	L	H

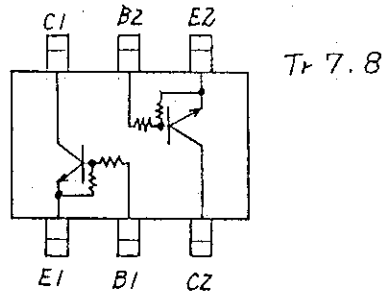
Forward rotation of sequence motor:
Mirror-up
Rewinding
(Switching by gear)

Reverse rotation of sequence motor:
Winding
Battery check

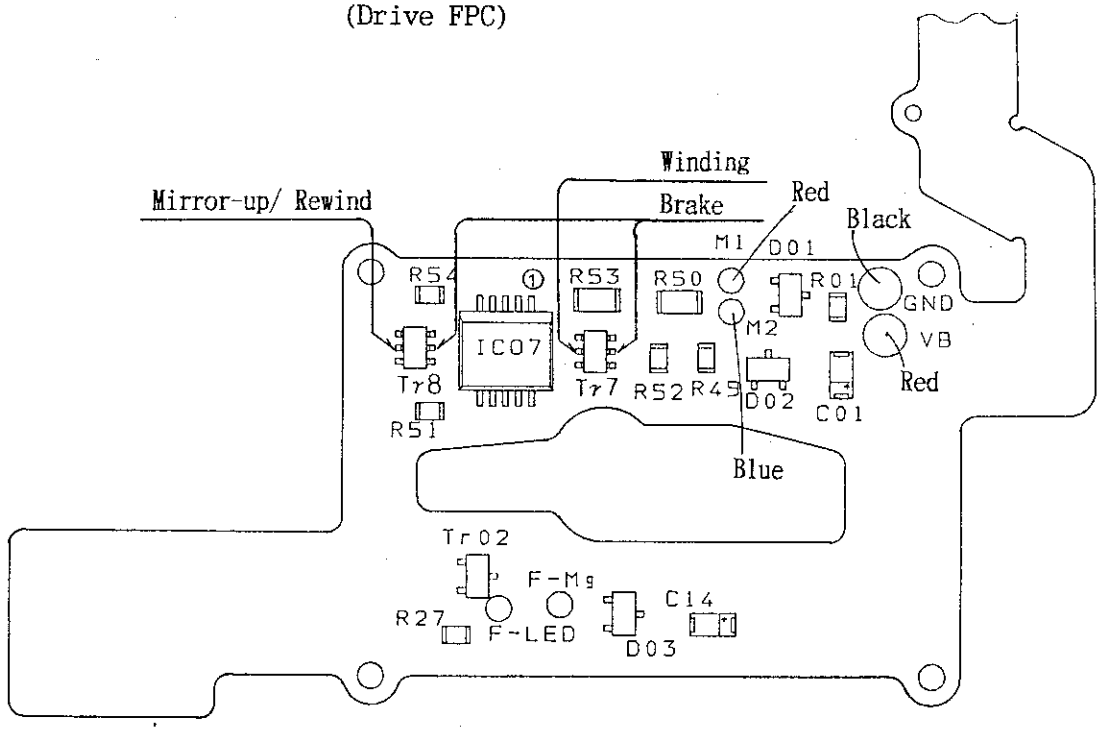
Sequence motor drive circuit



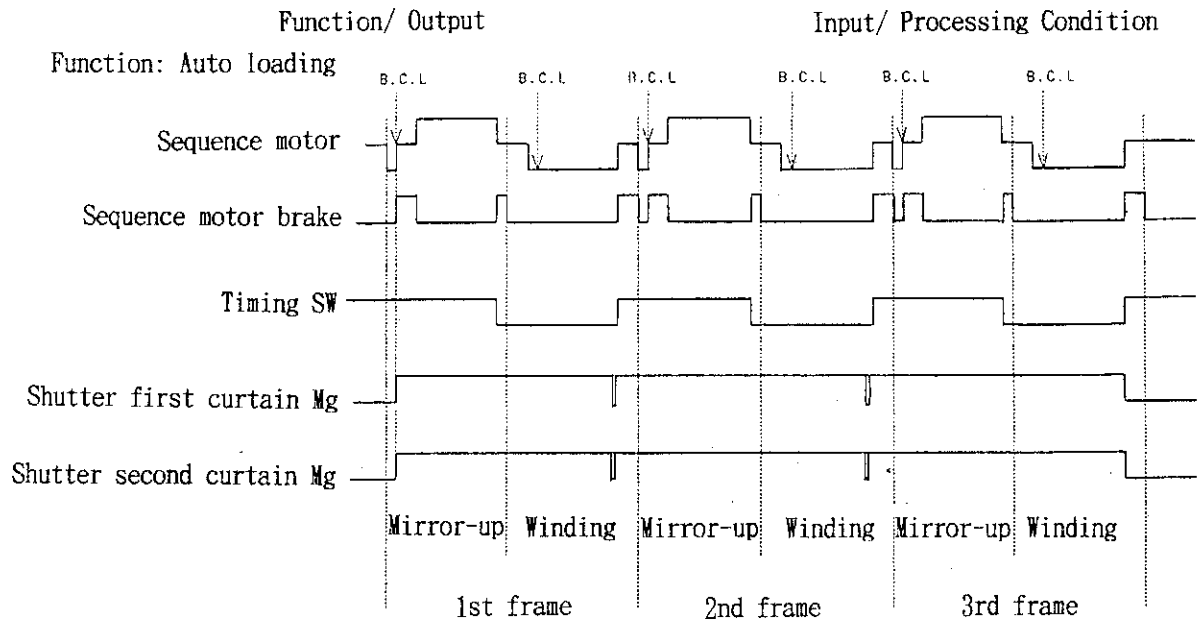

IC-7
1
2
3
4
5
10
9
8
7
6


C1
B2
E2
E1
B1
C2
Tr 7.8

(Drive FPC)


Winding
Mirror-up/ Rewind
Brake
Red
Black
M1
D01
R54
R53
R50
R01
GND
M2
VB
IC07
Tr8
Tr7
R52
R49
D02
C01
Red
R51
Blue
Tr02
F-Mg
R27
F-LED
C14
D03

AUTO LOADING TIME CHART



B.C.L. : Battery check"L"

Processing (Remarks)

As a rule, mirror-up and winding operations are repeated three times for blank shot advance.

* The sequence motor brake is turned off before the turning-on of the sequence motor.

① The first and second curtain magnets of the shutter are energized at mirror-up for the first frame and they are kept energized without allowing shutter operation till the end of the 3re frame winding.

② Aperture control is not performed at mirror-up during blank shot advance. (See another section for details.)

③ Winding control is the same as that in the normal shutter sequence. (For details, see "Winding".)

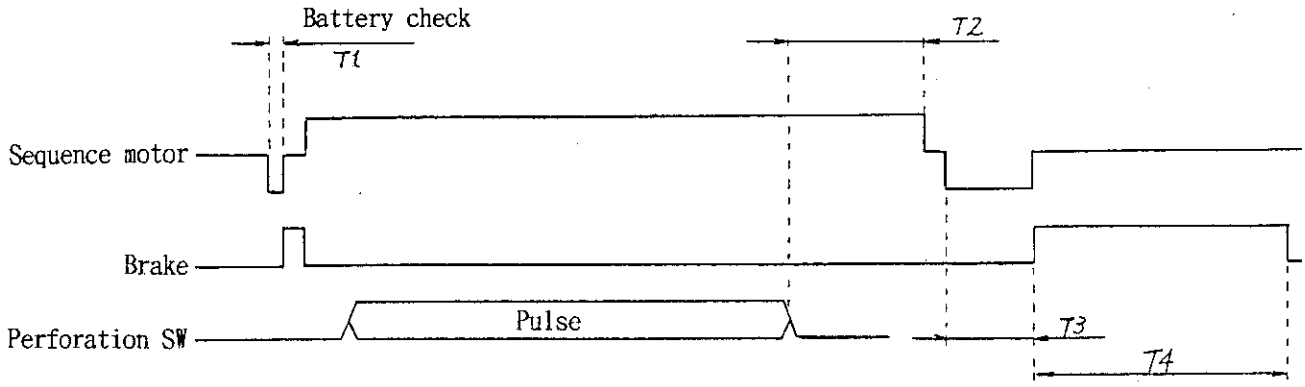
④ The shutter magnets are deenergized upon completion of the 3rd frame winding.

⑤ The operation limit time and the battery status processing are the same as those in the normal shutter sequence.

⑥ The "operation" flag is cleared after the completion of the 3rd frame winding and the deenergization of the shutter magnets.

Initialization is performed if the timing switch signal is low before start of the 1st frame advance.

REWINDING TIME CHART



T1: Battery check is performed after 1msec rotation of the sequence motor in the direction of winding.

T2: Perforation pulse check is started at the beginning of rewinding operation of the sequence motor and ended three seconds later of there is no change in perforation pulse.
When there is change in perforation pulse, the timer counting of three seconds is renewed.

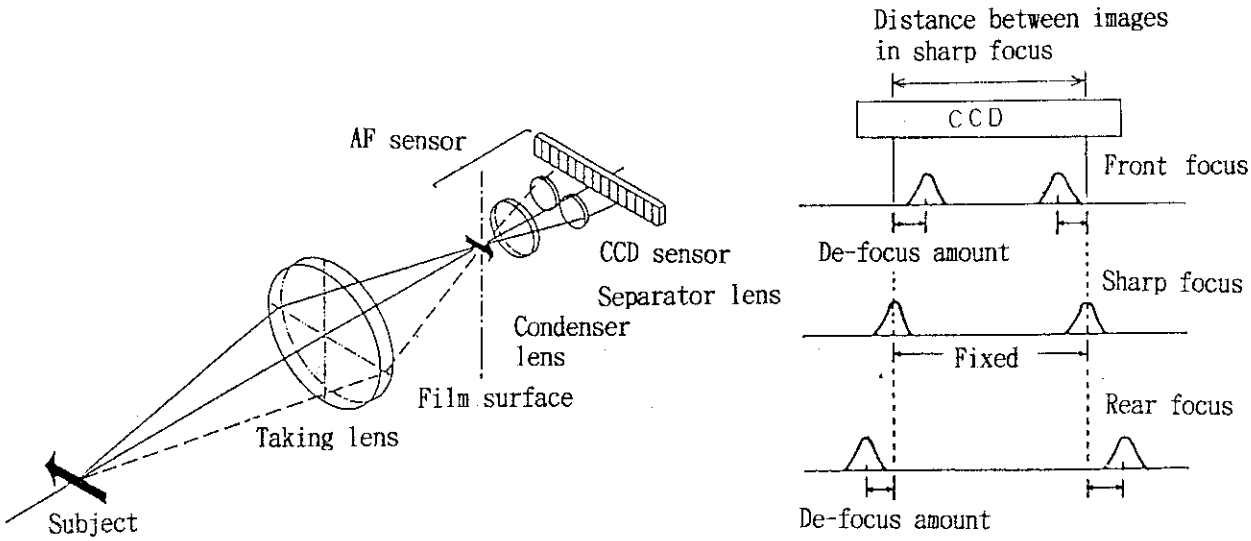
T3: The sequence motor operates in the direction of winding for 20msec.

T4: The sequence motor brake operates for 100msec.

AUTO FOCUS

(1) Principle of AF (distance metering)

This camera employs a TTL phase difference system for distance metering.



1)The image of the subject which passes though the taking lens and forms on the film surface passes through the separator lens and is formed again as two images on the CCD sensor.

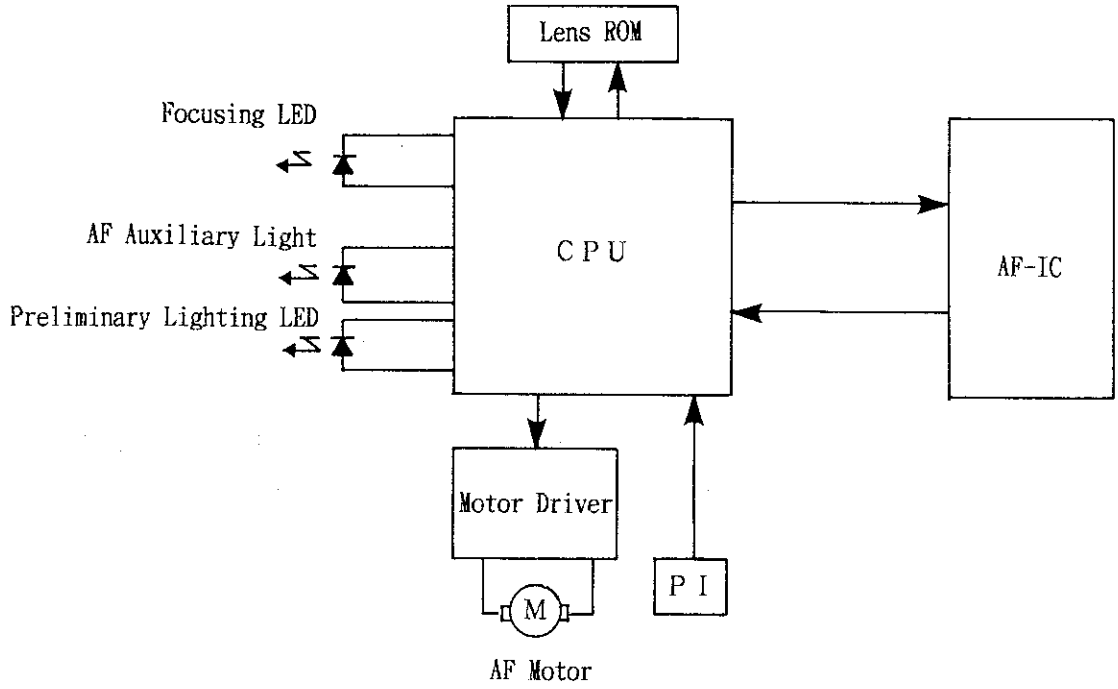
2)The distance between the two images reformed by the separator lens is detected as a signal by the CCD sensor element and this signal is sent to the CPU (calculation and control section for judgment and determination).

3)When the two reformed images are in forcus, the position of each image on the CCD sensor is always the same and the distance between, the images are constant. If front focusing occurs (image is forming brfore the film surface), the distance between the two images on the CCD sensor is shorter as they are close to the center axis of the lens. In the case of rear focusing (image formation behind film surface), the distance between the images is longer.

4)The focusing can be observed by comparing the distance between the two images with that in sharp focus.

5)The compared value is detected as the phase difference signal by the CCD sensor and this signal is processed instantaneously.
And the lens is adjusted to its focal position.

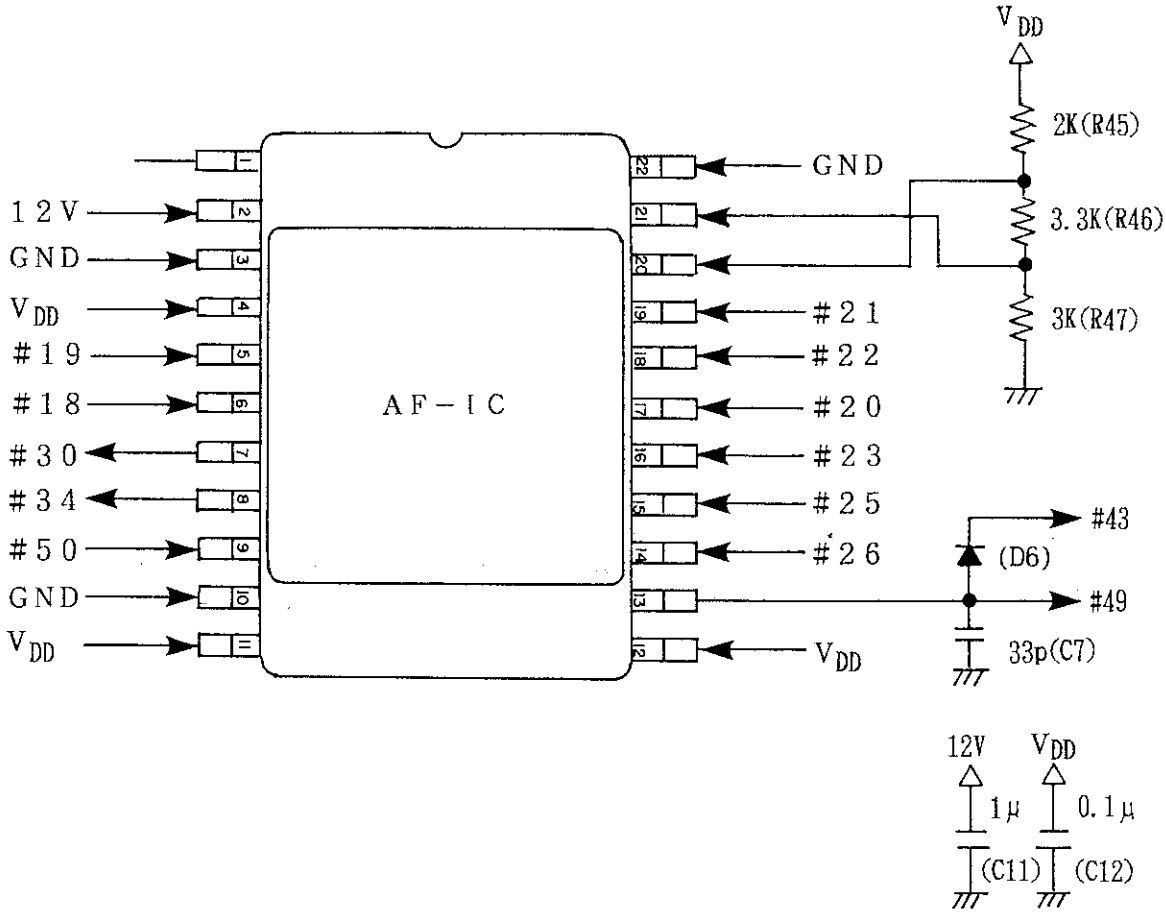
(2) AF Control Circuit



AF Control block Diagram

The light which passes the taking lens penetrates the main mirror and is led via the sub mirror to the AF module in the lower part of the body. The light is focused into an image on the CCD line sensor of AF-IC and converted to an electric signal. The CPU receives this analog signal by A-D convertion and calculates the required lens travel from this signal and the lens ROM data which has been received at another timing. According to the calculated lens travel, the CPU controls the motor driver to drive the AF motor. The actual lens travel is detected by the signal from the photo-interrupter. When focusing is completed or found impossible, the green LED lights up in the viewfinder. AF auxiliary light is emitted in the case of low brightness or impossible distance metering to assure high AF performance. The preliminary lighting LED is used at use of the auxiliary light to enhance the sensitivity.

(3) AF Circuit (Connection of Peripheral Circuit to CPU)



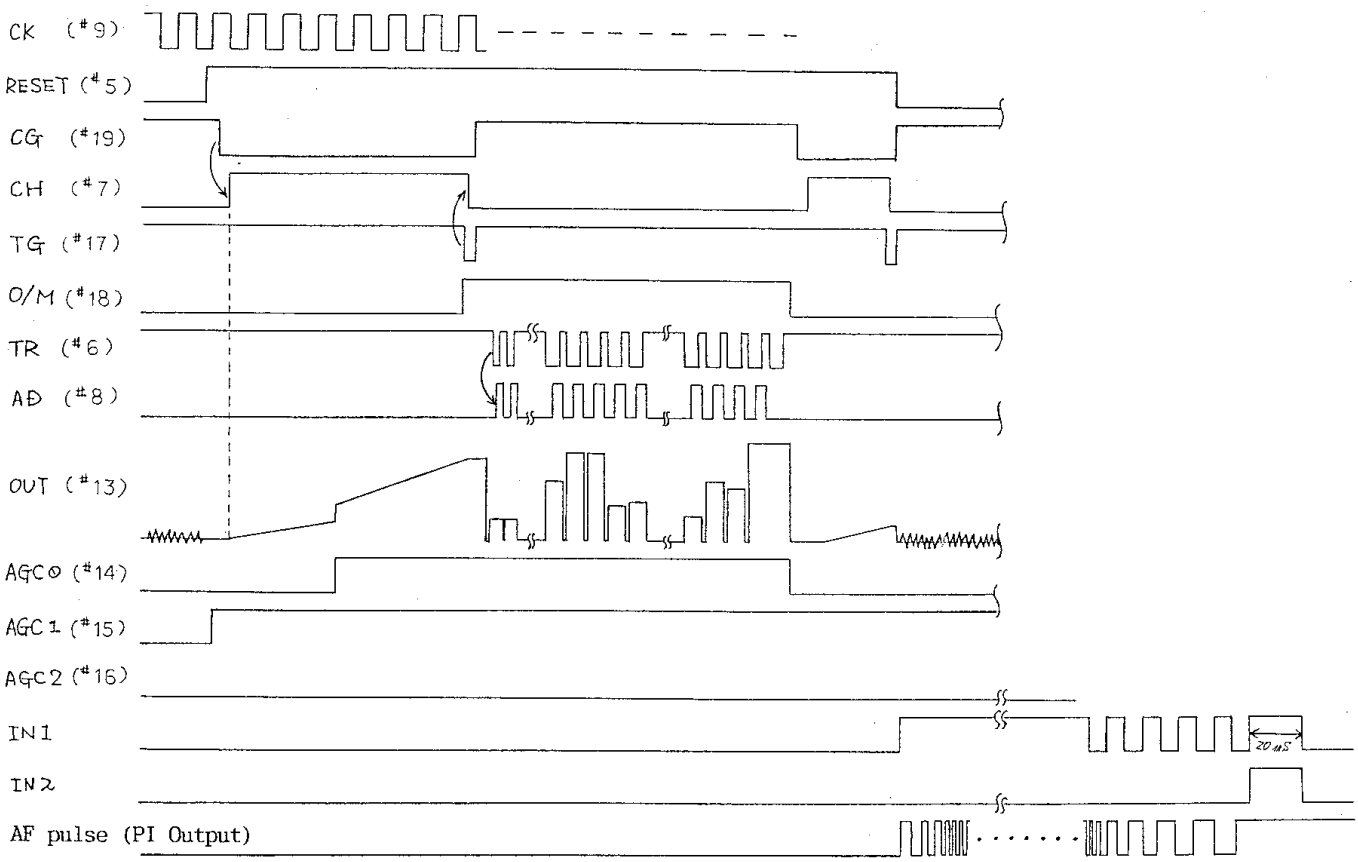
1)The reference voltage is divided by the resistances R45, R46 and R47 and applied to the No.20 and No.21 pins of AF-IC.

2)C7 is installed to eliminate noise at No.49 pin (A-D conversion input terminal) of the CPU.

3)D6 protects the No.49 terminal of the CPU.

4)C12 and C11 are installed between V_{DD} and GND and 12V and GND respectively as power supply by-pass capacitors (noise removal capacitors).

AF CONTROL TIMING CHART



(4) Description of AF Timing Chart

①When the RESET terminal signal is "L", electric charge is released.

②The RESET terminal signal is turned "H" before starting accumulation.

③Accumulation starts when the CG terminal signal changes from "H" to "L".

④When the CG terminal signal changes from "H" to "L", the CH terminal signal of AF-IC turns "H".

⑤After accumulation start, accumulation monitor voltage is output at the OUT terminal. However, the monitor voltage is not output if the O/M terminal signal is "L".

Monitor voltage:

a)The monitor voltage rises with the passage of time.
b)The rising rate increases (the inclination of waveform becomes steep) as the brightness of the subject increases.
c)The monitor voltage varies with the signal levels at the AGC 0 to 2 terminals.

⑥The amplification of the output at the OUT terminal is changed by the control of the AGC 0 to 2 terminal signals.

AGC2	AGC1	AGC0	Amplification
0	0	0	≒1
0	0	1	2
0	1	0	4
0	1	1	8
1	0	0	16
1	0	1	≒1
1	1	0	32
1	1	1	64

*Not used except at test

⑦Accumulation is ended in one of the following two ways:

a)The CPU sends the accumulation ending signal to AF-IC.

○The ending signal at TG is turned "L" when the monitor voltage reaches the predetermined level as a result of processing inside the CPU.

○When the monitor voltage does not reach the predetermined level, the TG terminal is turned "L" after 200ms (300ms when auxiliary light is lit) counted by the CPU.

*The TG signal function only when the O/M signal is "H".

b)Accumulation is automatically ended inside the AF-IC.

oIn cases other than a), the comparator in the IC operates to end accumulation when the accumulation of charge in AF-IC is saturated.
*This operation occurs only when the O/M signal is "L".

• The timing chart given on previous page shows an example of a).

⑧Upon completion of accumulation, the CH terminal turns "L". The CPU checks the "H" terminal signal for "L" and then returns the CG terminal signal to "H".

⑨The accumulation data is received when the O/M signal is "H". When the CPU changes the TR signal to AF-IC from "H" to "L", AF-IC outputs the data of one pixel to the OUT terminal and changes the AD signal to "H". The CPU checks the AD signal for "H" and then receives the output at the OUT terminal by A-D conversion. These operations are repeated until all the data are received. A-D conversion, however, is not performed for the first eight pixcels, which are dummy data, but is performed for the subsequent 128 pixcels.

⑩ Upon receiving all the data, the next accumulation is started and the operations 1 to 9 are repeated.

⑪ During lens drive, accumulation is suspended and the RESET signal is given to AF-IC.

*The timing chart given above shows an example of the case accumulation is suspended.

⑫ The lens drive direction is determined by the two signals IN1 and IN2 (described later). When not a little travel of the lens is required, the speed is reduced by pulse drive method (repetition of turning an and off the motor).

⑬ The lens is stopped by the operation of the brake (IN1 and IN2 signals are both "H") for 20ms. After lens stop, the motor is released (IN1 and IN2 signals turn "L").

Conditions for AF Operation Inhibition

AF operation is not performed when the camera is under any of the following conditions:

①The lens is not mounted. (The lens ROM is not read correctly.)

②The sequence is being executed. (Mirror up, down, shutter control, winding, rewinding or blank shot advance is being performed.)

③The lens drive speed is changing.

(5) Action-foreseeing AF Control of 270AF

The action-foreseeing AF control of 270AF is performed by processing on software only. Therefore, no special mechanism or hardware is provided to execute this function. This section describes the basic conception of the action-foreseeing AF control.

[Conditions]

1) In CAF mode or CIF stand-by mode
2) Not in pre-flash mode

Control pressing is carried out when both of the two conditions are met.

[Outline of Processing]

Ⅰ. Calculation of image speed

The shift of the image is calculated from the distance metering results and the lens travel between the distance meterings.
The image moving speed is calculated from the shift of the image and the distance metering cycle time.
The next image speed is calculated from the change in image moving speed and it is decided whether action-foreseeing focus control is possible or not.

Ⅱ-a. When action-foreseeing focus control is possible

[At CIF]
① From distance metering results, the image speed is estimated.
② The time required to bring the image in the sharp focus position is calculated from the estimated image speed and the de-focus value.
③ The time calculated in ② is counted down. Mirror-up operation is started when the time is counted down to the time to be taken between the mirror-up start and the shutter travel start.

(Time control)

[At CAF]
Follow-up drive control (half pressing of shutter release)
① The image speed is estimated from the distance metering results and lens travel.
② While reducing the de-focus value, drive control is performed so that the lens drive speed is adjusted to the image speed finally.

(Speed control)

Shutter release control (full pressing of shutter release)
① Mirror-up is started at press of the shutter release.
② The lens drive speed is changed at the point when the lens is expected to catch up with the image.
(→ Lens drive speed = Image speed)
③ Lens stop control is performed at completion of mirror-up and the shutter operation is started after completion of lens stop.

Ⅱ-b. When action-foreseeing focus control is impossible
Normal Control (the same control as SAMURAI Z) is performed.

(6) AF Motor Drive Circuit

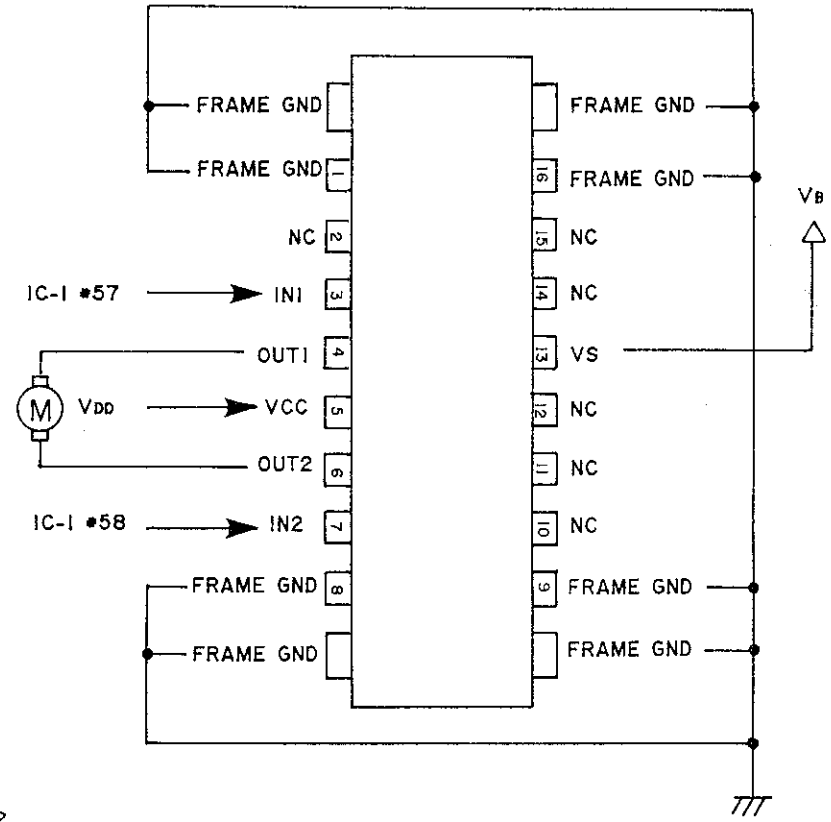
The AF motor drive is performed by the AF motor drive IC (IC-6) and controlled by IC-1.

Direction of motor shaft ratation	IC-1 → IC-6 #57 IN1	IC-1 → IC-6 #58 IN2
Motor free	L	L
Counterclock-wise as viewed facing coupler	H	L
Clockwise as viewed facing coupler	L	H
Brake	H	H

Direction of coupler rotation	Direction of lens moving
Clockwise	Closest point to infinity
Counterclockwise	Infinity to closest point

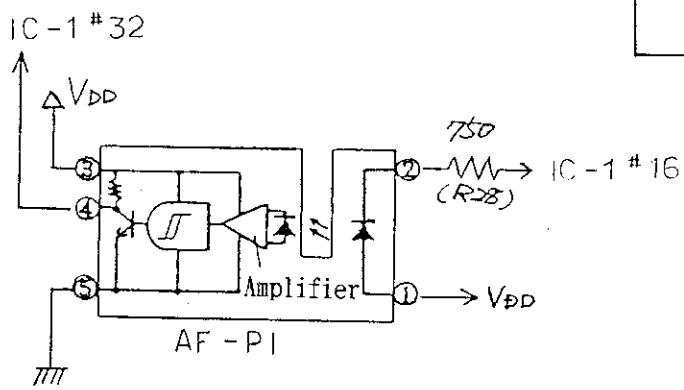
Note: Remember that the direction of the 35 to 105 AF lens moving is opposite to the direction of coupler rotation.

AF Drive IC (IC-6)

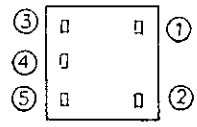


(7) AF-PI

In focusing operation, the lens travel is being detected by the signal from AF-PI (photo-interrupter).

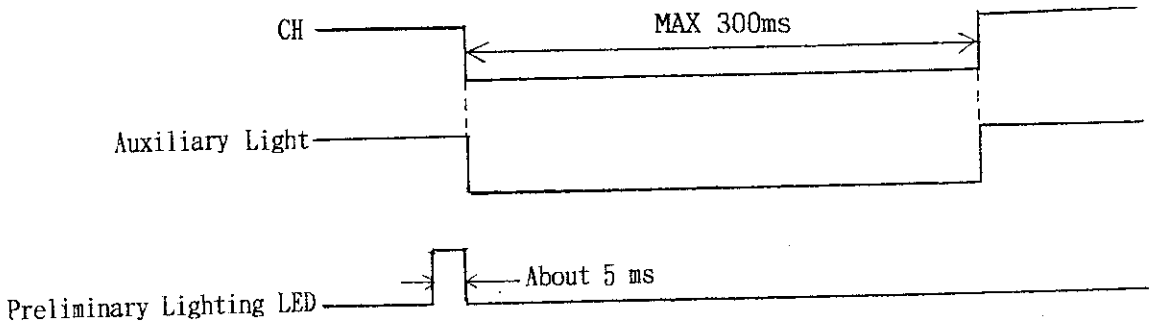


Arrangement of AF-PI pins

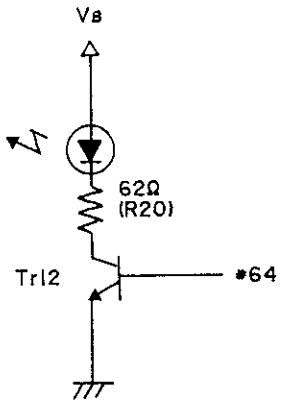


(8) AF Auxiliary Light

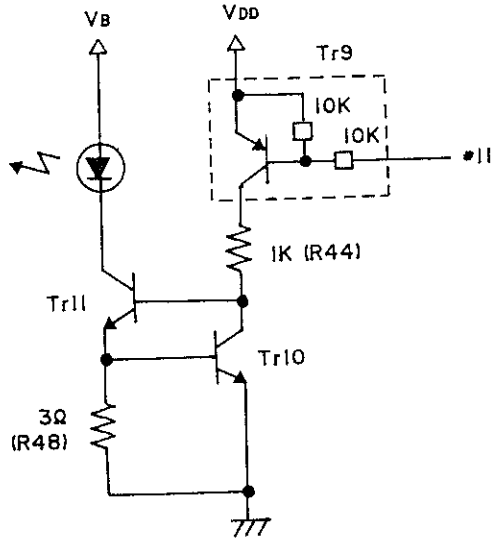
○Flash Timing



When the CPU determines that auxiliary light is necessary, auxiliary light is emitted in synchronism with accumulation by AF-IC. When auxiliary light is emitted, the maximum accumulation time is 300ms.
To enhance the effect of auxiliary light, the preliminary lighting LED is lit for about 5ms immediately before start of accumulation.

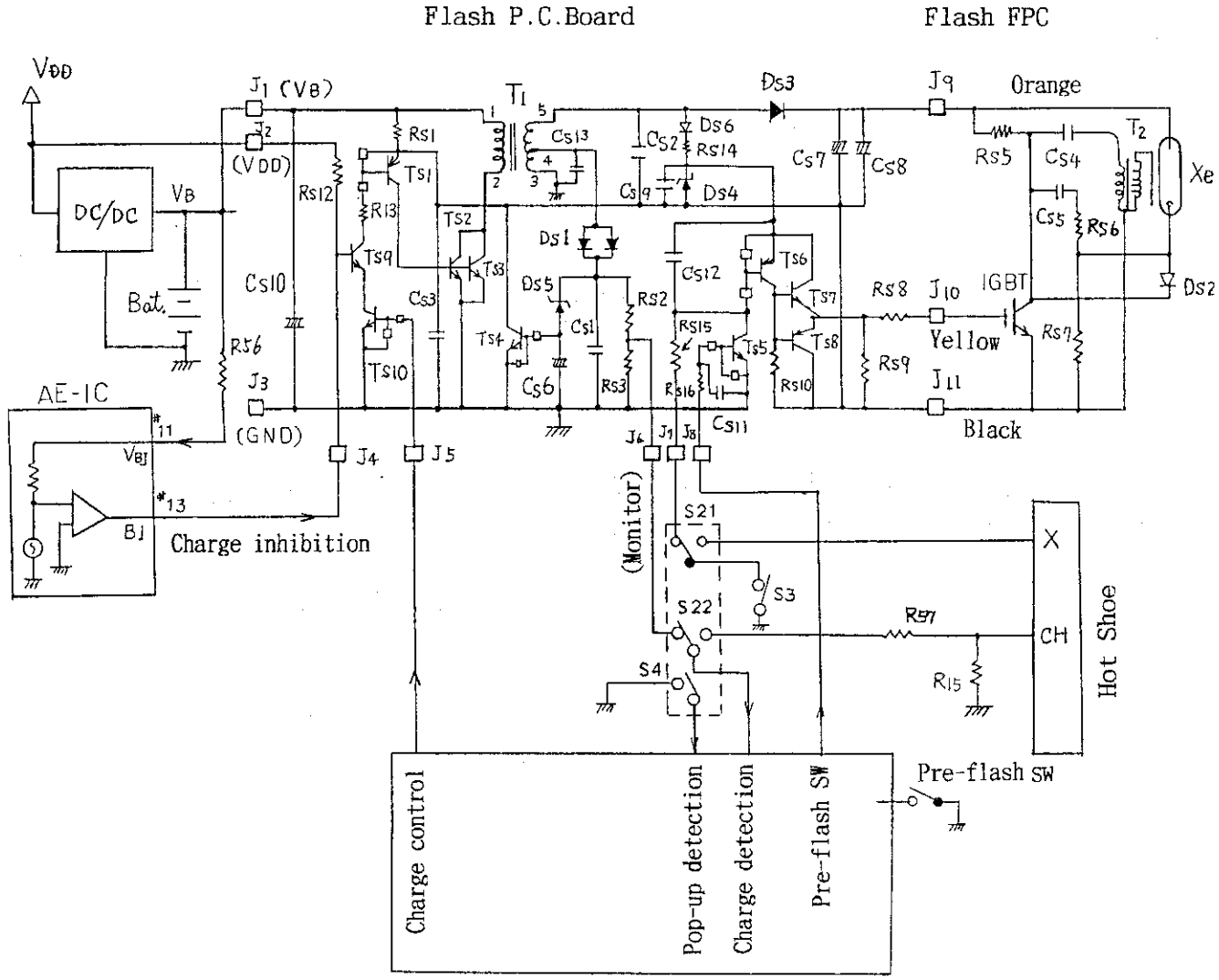


Preliminary Lighting
LED Circuit.



AF Auxiliary Light Circuit

FLASH CIRCUIT



(1) Flash Charge Circuit

When the flash is popped up, the No.46 pin of M-CPU turns "H" and at the detection of the pop-up switch operation, M-CPU outputs "H" signal from its No.1 pin. Accordingly. TS10 turns on and TS9, TS1, TS2 and TS3 turns on in sequence and the oscillation of the flash is started.
The counter electromotive force generated on the secondary side of the oscillation transformer (T1) is rectified by the diode DS3 and stored in the main electrolytic capacitors CS7 and CS8. The voltage of the main electrolytic capacitors rises up 280V.

(2) Charge Stop Circuit

Simultaneously with the rise of the voltage at the No.5 pin of T1 up to 280V, the voltage at the No.4 pin of T1 rises to about 10V and the charge stop monitor voltage reaches 2.4V at the division resistance RS2 and RS3 via DS1. At this point, M-CPU detects the completion of charging the main capacitors to 280V.

At the detection of the completion of charging by the 47 pin of M-CPU, the No.46 pin of M-CPU turns "L" and TS10 turns off to stop charging.

(3) Flash protection Circuit

This circuit stops charging even when the charge stop monitor voltage 2.4V is not detected because of some trouble in the control circuit. Generally, the protection circuit does not operate when the camera is displaying normal functions.
The raised voltage from the No.1 pin of T1 reaches 9.1V at the base of TS4 via DS1 and DS5. Then Tr4 turns on and Tr1 turns off to stop oscillation.
At the rise of the charge voltage up to 320V, DS5 operates and the flash protection circuit turns on.

(4) Charge Check

P.H. turns off upon the passage of 16 seconds with the flash popped up. When P.H. is turned on again by some operation, charge check is performed. Charging is started again if the charge voltage at the main capacitors is low. In the catching focus stand-by mode, charge check is performed once in about two minutes and a half to check for voltage drop due to natural discharge.

(5)Charge Inhibition Circuit

If the battery voltage drops to 2.2V or below because of charging, the DC-DC converter does not operate and thus the circuit does not. The charge inhibition circuit prevents such trouble dur to charging.
After start of charging, the battery voltage drops steeply.
Then the comparator in the analog IC operates and stops charging. And charging is started when the battery voltage recovers. Charging is stoppes again when the battery voltage drops. The charge inhibition circuit dose not operate when the charge voltage reaches 150V and the battery voltage is about 4V.

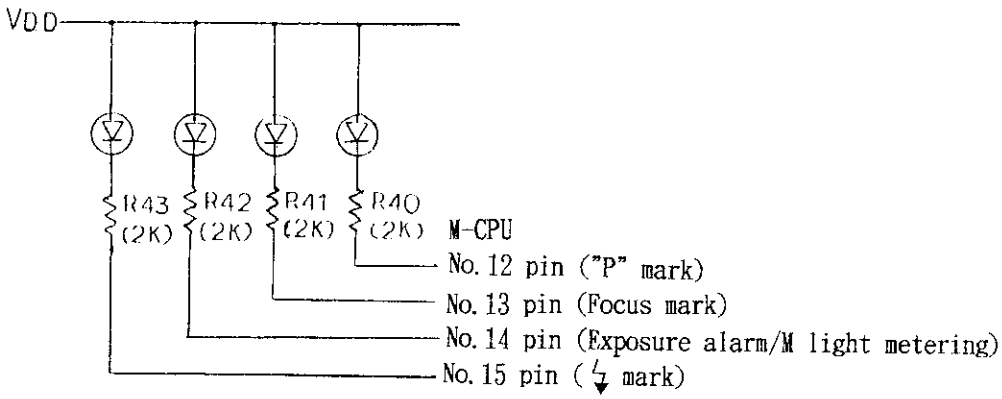
(6) Flash Control Circuit

In parallel with the 280V charge voltage line, the flash trigger switch voltage at TGBT is applied to CS9 via DS6 and RS14 until the capacitor is charged to 33V. Upon Completion of charging CS9 to 33V, DS4 turns on and the trigger signal from IGBT is waited.
At press of the shutter release, the first curtain travels. And 1/90 sec later, the second curtain travels and the X contact of the shutter turns on. Then TS6 and then Tr7 turns on and 30V is applied to IGBT, which turns on. By this operation, CS4 is discharged and the trigger coil (T2) is excited. A high voltage is generated on the second side of T2 and it serves as a trigger so that current flows in the xenon tube. And the main capacitors CS7 and CS8 are discharged to fire the flash.

(7)Pre-flash Control Circuit

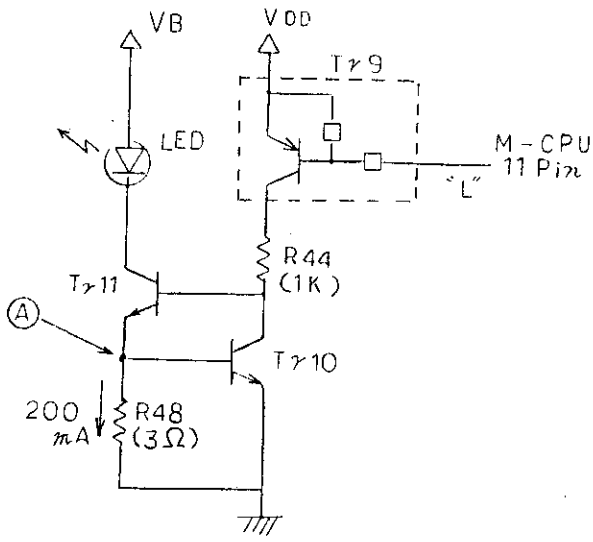
* A burst of light emitted by the pre-flash system prior to the normal flash reduces the possibility of red-eye in photographs by contracting the pupils of the subject's eyes.
  When the pre-flash switch is set to the pre-flash mode ( ), the No.46 pin of S-CPU turns "L" and M-CPU starts pre-flash control. Press of the shutter release triggers the pre-flash 40 μ sec later. After pre-flash, recharing is performed within 0.8 sec and the mirror is driven up. After that, the shutter operates, the X contact turns on and the normal flash is triggred.

VIEWFINDER DISPLAY LED DRIVE CIRCUIT



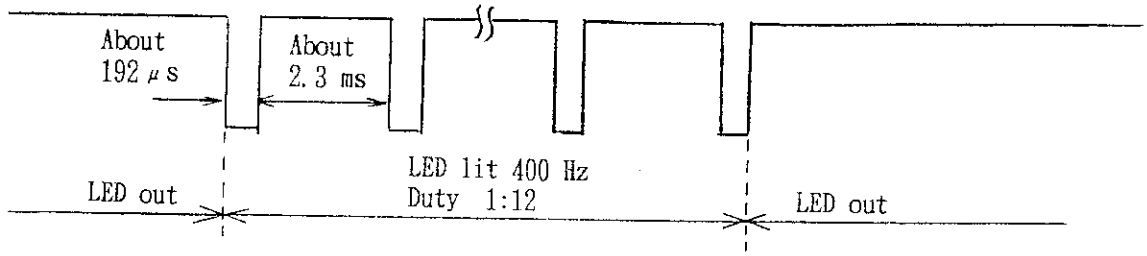
Each LED lights up when the M-CPU port signal is low and goes out when it is high. There are no drive circuits, such as transistors, because direct drive by M-CPU is used.

SELF-TIMER LED CIRCUIT



When the "L" signal is output from the No.11 pin of M-CPU, Tr9 and Tr11 turn on and the self-timer LED lights up. Tr10 and Tr11 constitute a constant-current circuit. The potential at point Ⓐ is about 0.6V.

The LED lights up when the signal is low. Acturally, however, the signal is modulated.



SERIAL COMMUNICATION

In serial communication, the four following communications are performed:

① Communication between CPU
S-CPU sends switch data to M-CPU.
M-CPU sends time, aperature, data and operation status information to S-CPU. (This communication is performed to display the light metering data on the LCD.)

② M-CPU reads data from the lens ROM.

③ S-CPU reads data from EEPROM.
S-CPU writes data in EEPROM.

The communications above are not performed simultaneously because only one serial communication line is provided. The CPUs check the serial communication line for availability first and then start communication.
Whether or not the serial line is now available for communication is decided by SCR signal. Communication is allowed when SCR=H. The CPU executing serial communication outputs SCB signal to inform the other CPU that it is executing serial communication.
The SCB signal (output) form M-CPU becomes the SCR signal (input) to S-CPU, while the SCB signal (output) from S-CPU becomes the SCR signal (input) to M-CPU.

Indications of Communication Line in Troubles

① The display is lit during the press of the mode, drive, compensation or distance limit button and for about one second after its release.

② At the turning-off of the main switch, the LCD panel displays "OFF" but the LED inside the viewfinder keeps lighting.

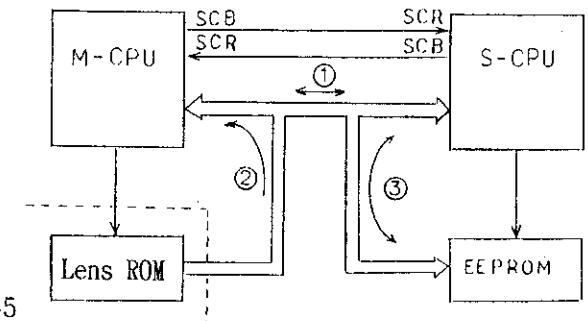
③ At press of the mode, drive, compensation or distance Limit button, the display changes but the time/aperture display does not appear.
Although the time/aperture display data is sent from M-CPU to S-CPU, the setting value by the user is displayed only by S-CPU. Therefore, depending on the exposure mode, the indication is as follows:

Program: Neither time nor aperture value is displayed.
Av : Aperture value is displayed but time is not.
Tv : Time is displayed but aperture value is not.
Mn : Time and aperture value are both displayed.

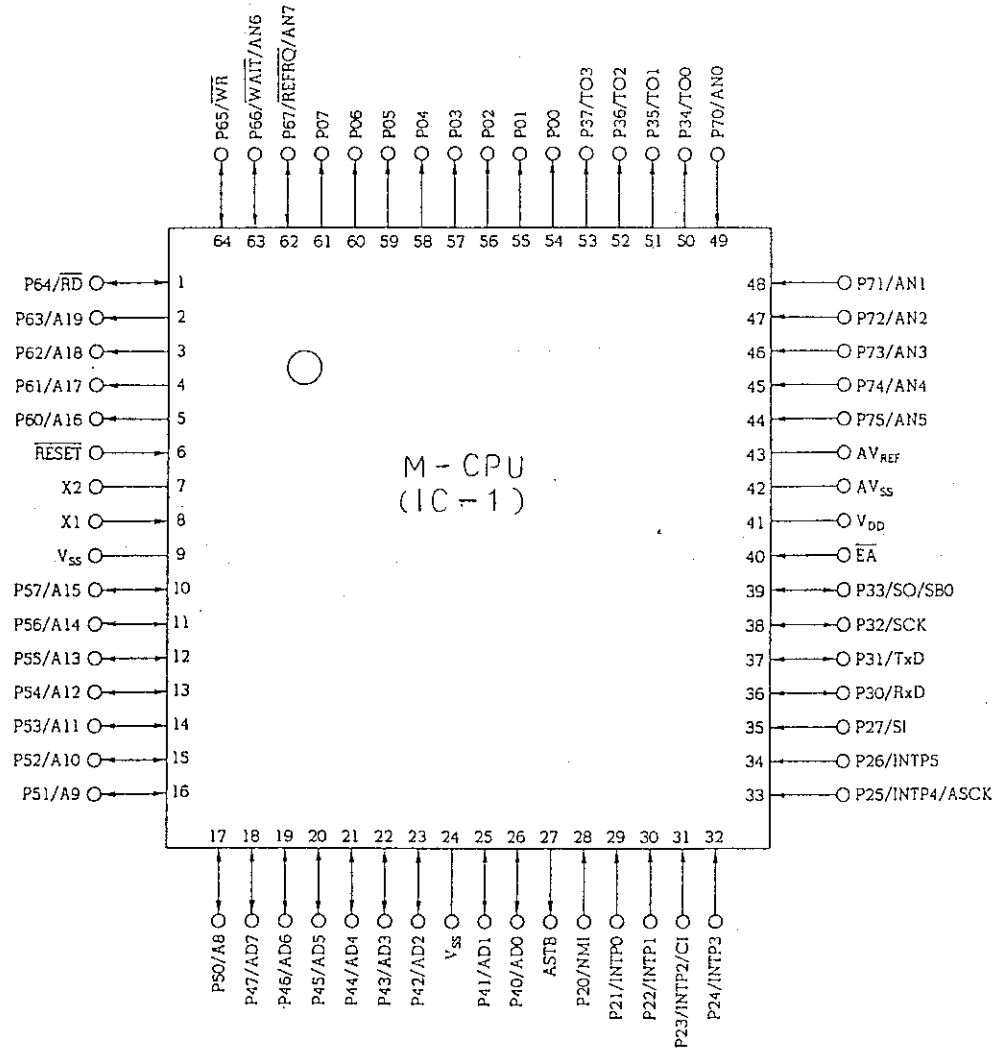
The state ① indicates that communication is not possible in any direction.
The state ② or ③ shows that communication is not possible in the M→S direction.

Make sure that SCR=H, SCB=H and the CPUs are connected to each other.
Other communication signals repeat turning "L" or "H" during communication.
When communication is not being performed, REQ=H, ACK=H and SCK=H.

(Connection Diagram of Communication)



TERMINAL FUNCTIONS OF M-CPU (IC-1)



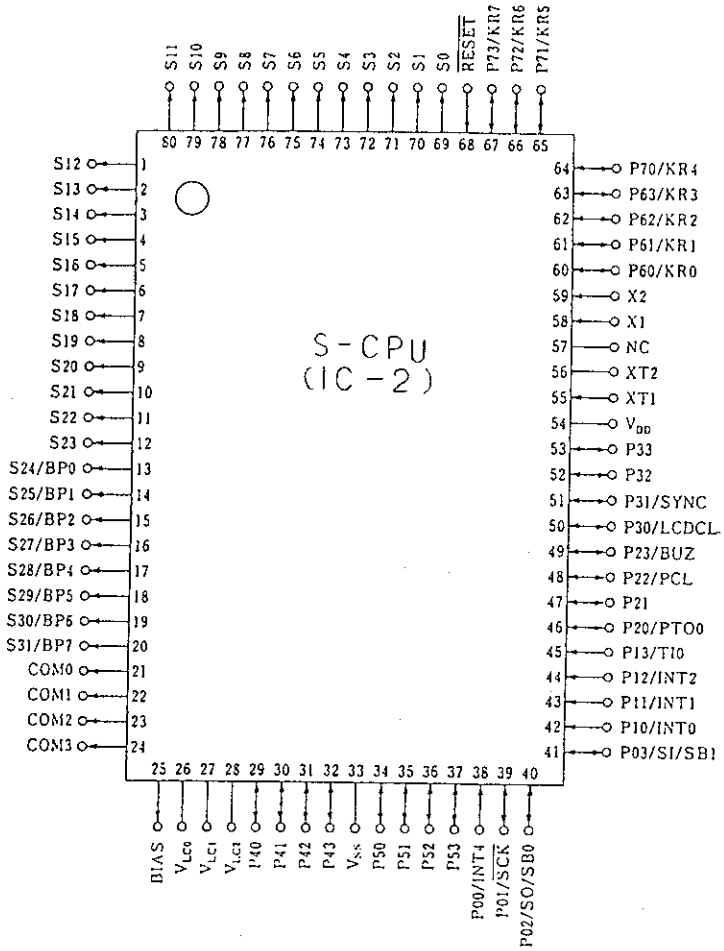
Pin No.	Terminal Name	Signal Name	I/O	Function
1	P64	Built-in flash charge control	Output	Charge in "H"
2	P63	Ave/Spot selection	Output	"H": Ave, "L": Spot
3	P62	Imprinting ISO selection	Output	"H": ISO400 or above "L": Below ISO400
4	P61	Date imprinting	Output	Imprinting in "H"
5	P60	CS (Lens ROM)	Output	Lens ROM selection terminal for serial communication
6	$\overline{\text{RESET}}$	Reset (M-CPU)	Input	M-CPU reset in "L"

Pin No.	Terminal Name	Signal Name	I/O	Function
7	X2		Input	System clock input terminal (12 MHz)
8	X1		Input	
9	Vss			GND
10	P57	Pre-flash control signal	Output	Pre-flash in "H"
11	P56	Auxiliary light (Self) LED	Output	Lighting in "L"
12	P55	"P" mark LED	Output	LEDs in viewfinder Lighting in "L"
13	P54	Focusing LED	Output	
14	P53	Exposure warning LED	Output	
15	P52	" ↯ " mark LED	Output	
16	P51	AF-PI LED	Output	AF photo-interrupter LED Lighting in "L"
17	P50	Aperture PI LED	Output	Aperture photo-interrupter LED Lighting in "L"
18	P47	ØTR	Output	AF-IC control signal
19	P46	AF-RESET	Output	
20	P45	ØTR	Output	
21	P44	ØCG	Output	
22	P43	O/M-SELECT	Output	
23	P42	AGC2	Output	
24	Vss		-	GND
25	P41	AGC1	Output	AF-IC control signal
26	P40	AGC0	Output	
27	ASTB			Not used (grounding processing)
28	NMI			Not used (grounding processing)
29	INTP0	LAD	Input	Light metering IC control signal
30	INTP1	ØCH	Input	AF-IC control signal

Pin No.	Terminal Name	Signal Name	I/O	Function
31	INTP2	Aperture encoder pulse	Input	Aperture pulse input (from aperture photo-interrupter)
32	INTP3	AF encoder pulse	Input	AF pulse input (from AF photo-interrupter)
33	INTP4	REQ (from S - CPU)	Input	Signal input for serial communication request (S→M)
34	INTP5	∅AD	Input	AF-IC control signal
35	SI	Serial data input	Input	Input terminal for serial communication data
36	P30	ACK	Input & output	Serial communication responese signal
37	P31	SCB	Input	Signal during serial communication with lens ROM
38	SCK	Serial lock	Input & output	Clock terminal for serial communication
39	SO	Serial data output	Output	Serial communication data input terminal
41	VDD	VDD	-	VDD power (5V)
42	A Vss	Analog GND	-	Analog GND
43	A V REF	A V REF	-	A-D conversion reference voltage
44	P75	AF/MF selector SW	Input	"H": AF, "L": MF
45	P74	SCR	Input	Monitor signal during serial communication (S-CPU)
46	P73	Pop-up SW	Input	"H": Pop-up, "L": Pop-down
47	P72	CH	Input	Charge completion signal (interlocked with pop-up SW)
48	AN1	Battery voltage monitor	Input	Battery monitor voltage (analog input)
49	AN0	AF-IC output signal	Input	Analog signal for AF distance metering result
50	TO0	AF-CLK	Output	Clock for AF-IC drive

Pin No.	Terminal Name	Signal Name	I/O	Function
51	P35	REQ (to S-CPU)	Output	Signal output for serial communication request (S→M)
52	P36	SP1	Output	Light metering result output
53	P37	BEEP	Output	Buzzer output for focusing
54	P00	Sequence motor forward rotation	Output	Forward rotation in "H" (P01 and P02 signals are "L")
55	P01	Sequence motor reverse rotation	Output	Reverse rotation in "H" (P00 and P02 signals are "L")
56	P02	Sequence motor brake	Output	Brake in "H" (P00 and P01 are "L")
57	P03	AF motor control 1	Output	H, L ├ Counterclockwise rotation
58	P04	AF motor control 2	Output	L, H ├ Clockwise rotation H, L ├ Brake L, L ├ Free
59	P05	Aperture Mg	Output	Aperture control stop in "H"
60	P06	Shutter first curtain Mg	Output	First curtain hold off in "L"
61	P07	Shutter second curtain Mg	Output	Second curtain hold off in "L"
62	P67	Perforation SW	Input	Pulse input interlocked with perforation SW
63	P66	Timing SW	Input	"H": Winding completion "L": Mirror-up completion
64	P65	AF-IC preliminary lighting LED	Output	Preliminary lighting in "H"

TERMINAL FUNCTIONS OF S-CPU (IC-2)



Pin No.	Terminal Name	Signal Name	I/O	Function
1 ~ 18	S12 ~ S29	Segment signal	Output	LCD segment output terminal
19	S30	NC		Not used (open)
20	S31	NC		Not used (open)
21	COM0			
22	COM1	Common signal	Output	LCD common output terminal
23	COM2			
24	COM3		Output	Not used (open)
25	BIAS			

Pin No.	Terminal Name	Signal Name	I/O	Function
26	VLC0	LCD drive power	-	Connected to "BIAS"
27	VLC1		-	VLC0 *2/3 (v)
28	VLC2		-	VLC0 *1/3 (v)
29	P40	SW read output	Output	Matrix SW scan output
30	P41			
31	P42			
32	P43	CS (EEPROM)	Output	EEPROM selection terminal for serial communication
33	Vss			GND
34	P50	PH (to DC/DC converter)	Output	L:Power hold,H:Power off
35	P51	RESET	Output	Reset output (to M-CPU & AE-IC)
36	P52	REQ (to M-CPU)	Output	Signal input for serial Communication request (S→M)
37	P53	SCB	Output	Signal during serial communication
38	INT4	Back cover SW	Input	"H" Back cover closed, "L" Back cover open
39	SCK	Serial lock	Output	Clock terminal for serial communication
40	SO	Serial data output	Output	Output terminal for serial communication data
41	SI	Serial data input	Input	Input terminal for serial communication data
42	INT0	REQ (from M-CPU)	Input	Signal input for serial communication request (M→S)
43	INT1	Main SW	Input	"H": Main OFF, "L": Main ON
44	P12			Not used (grounding processing)
45	P13			Not used (grounding processing)
46	P20	Pre-flash SW	Input	"H": OFF, "L": ON

Pin No.	Terminal Name	Signal Name	I/O	Function
47	P21	DX0 (C/D)	Input	DX code read terminal (Also test mode communication terminal)
48	P22	DX1 (M/$\overline{A}$)	Input	
49	P23	DX2 ($\overline{REQ}$)	Input	
50	P30	DX3	Input	
51	P31	DX4 (ACK for TEST)	Input & output	
52	P32	ACK (to M-CPU)	Input & output	Serial communication response signal
53	P33	SCR	Input	Monitor signal during serial communication (S-CPU)
54	VDD		-	Vcc power
55	XT1		Input	Input terminal for sub system clock (32KHz)
56	XT2		Input	
57	Vpp	NC	-	
58	X1		Input	Input terminal for main system clock (4.19MHz)
59	X2		Input	
60	P60	P-Reset SW	Input	"H": OFF, "L": ON
61	P61	SW read input	Input	Matrix SW scan input
62	P62			
63	P63			
64	P70	Release SW	Input	"H": OFF, "L": ON
65	P71	TEST	Input	Reset output (to M-CPU, AE-IC)
66	P72	Rewind SW	Input	"H": OFF, "L": ON
67	P73			Not used (pull-up processing to Vcc)
68	$\overline{RESET}$	Reset (M-CPU)	Input	S-CPU reset in "L"

Pin No.	Terminal Name	Signal Name	I/O	Function
69 ～ 80	S0 ～ S11	Segment signal	Output	LCD segment output terminal

FUNCTIONS OF ELECTRONIC PARTS

Symbol	Function	FPC/Board
Resistors		
R-2	Pull-up resistance for CS terminal of EEPROM	Main FPC
R-3	Pull-up resistance for rewind SW	Main FPC
R-4	Pull-up resistance for release SW	Main FPC
R-5	Resistance to stabilize basic clock of S-CPU (32KHz)	Main FPC
R-6	Pull-up resistance for reset terminal of S-CPU	Main FPC
R-8	Pull-up resistance for main SW (battery cover SW)	Main FPC
R-9	Pull-up resistance for P-Reset SW	Main FPC
R-10	Pull-up resistance for test terminal (for adjustment)	Main FPC
R-11	Pull-up resistance for back cover SW	Main FPC
R-12,13	Division resistance for battery level check	Main FPC
R-14	Pull-up resistance for REQ terminal (M→S)	Main FPC
R-15	Load resistance for CH terminal for external flash	Shoe Reinforcement Board
R-16,17,18	Division resistance for LCD drive voltage	Main FPC
R-19	Pull-up resistance for reset terminals of M-CPU and AE-IC	Main FPC
R-20	Current limiting resistance for AF-IC preliminary lighting LED	AF-FPC
R-21	Pull-up resistance for SCR (M) – SCB (S)	Main FPC
R-22	Pull-up resistance for AF/MF selector SW	Main FPC

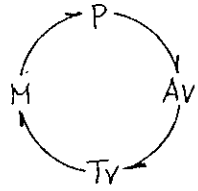
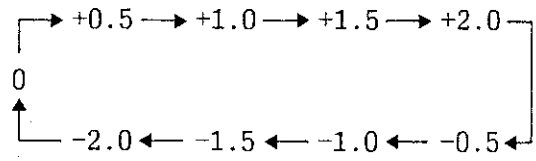
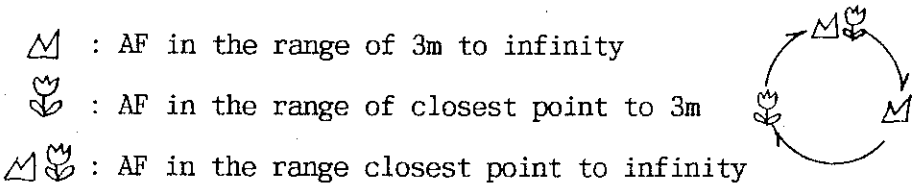
Symbol	Function	FPC/Board
R-23	Pull-up resistance for non-maskable interruption terminal of M-CPU (not used)	Main FPC
R-25	Protective resistance for power line of lens ROM contact	FPC-L
R-26	Protective resistance for serial data line of lens ROM contact	Main FPC
R-27	Current limiting resistance for LED of aperture PI	Drive FPC
R-28	Current limiting resistance for LED of AF lens PI	AF-FPC
R-30,31	Division resistance for VJ2 voltage take-out	Main FPC
R-32,33,34	VR output adjusting resistance(R-33 in variable)	Main FPC
R-35,37	Vref voltage regulation	Main FPC
R-38	Current limiting resistance for input to SPD	Main FPC
R-39	Prevention of aperture PI output saturation	Main FPC
R-40	Current limiting resistance for "P" mark LED in viewfinder	Main FPC
R-41	Current limiting resistance for sharp focus LED (green) in viewfinder	Main FPC
R-42	Current limiting resistance for camera shake/ incorrect exposure earning LED (red) in viewfinder	Main FPC
R-43	Current limiting resistance for " ↯ " mark LED in viewfinder	Main FPC
R-44	Current control resistance for Self LED	Main FPC
R-45,46,47	Division resistance for V MAJ and V ZD take-out	AF-FPC
R-48	Current control resistance for Self LED	Main FPC
R-49,52	Pull-up resistance for sequence motor brake circuit	Drive FPC
R-50,53	Base current limiting resistance for sequence motor power Tr (PNP)	Drive FPC
R-51,54	Base pull-down resistance for sequence motor power Tr (NPN)	Drive FPC
R-55	Pull-up resistance for pop-up SW	Main FPC
R-56	VB level detection at flash charge	Main FPC

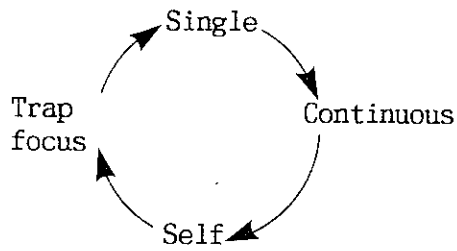
Symbol	Function	FPC/Board
R-57	Protective resistance for CH terminal input	Shoe Reinforcement Board
Capacitors		
C-1	Stabilization of rest IC input (VB)	Drive FPC
C-2,3	S-CPU 32KHz oscillation	Main FPC
C-4	Stabilization of hard reset output	Main FPC
C-5	Stabilization of V REF voltage	Main FPC
C-6	Stabilization of battery check voltage	Main FPC
C-7	Stabilization of AF-IC output signal	AF-FPC
C-8	AF-IC power by-pass capacitor	Main FPC
C-9	Stabilization of VS voltage	Main FPC
C-10	Light metering integration	Main FPC
C-11	AF-IC 12V power by-pass capacitor	AF-FPC
C-12	AF-IC 5V power by-pass capacitor	AF-FPC
C-13	VDD line by-pass capacitor	Main FPC
C-14	Stabilization of VCC and VDD power	Drive FPC
C-15	Stabilization of power supply voltage	Battery contact
C-16	Stabilization of VCC power	Constant-voltage IC Board
Transistors		
Tr-1	Hard reset signal output	Main FPC
Tr-2	Aperture Mg drive	Drive FPC
Tr-3	Output change of battery level check voltage	Main FPC
Tr-4(2 pcs.)	Shutter Mg drive	Main FPC
Tr-5	Vref constant voltage regulation	Main FPC
Tr-6	Prevention of aperture PI output saturation	Main FPC
Tr-7(2 pcs.)	Serquence motor drive	Drive FPC
Tr-8(2 pcs.)	Serquence motor drive	Drive FPC

Symbol	Function	FPC/Board
Tr-9.10.11	Self-timer LED drive	Main FPC
Tr-12	Drive of AF-IC preliminary lighting LED	AF-FPC
Tr-13	"Valid/Invalid" changeover of timing SW (Prevention of midway return of rewind SW)	Main FPC
Tr-14	External release signal input (Electrostatic measure)	Flash P.C. Board
Diodes		
D-1	Prevention of reverse current to VB caused by VDD voltage (for VCC voltage output)	Drive FPC
D-2(2pcs.)	VCC and VDD voltage output	Drive FPC
D-3	Elimination of counter electromotive force caused by aperture Mg	Drive FPC
D-4	Clock line protection at short circuit at lens ROM contact	Main FPC
D-5	Prevention of aperture PI output saturation	Main FPC
D-6	A-D terminal protection (Schottky diode)	Main FPC
Oscillators		
XT1	Piezoelectric oscillator (12MHz)	Main FPC
XT2	Piezoelectric oscillator (4,19MHz)	Main FPC
XT3	Quartz oscillator (32KHz)	Main FPC

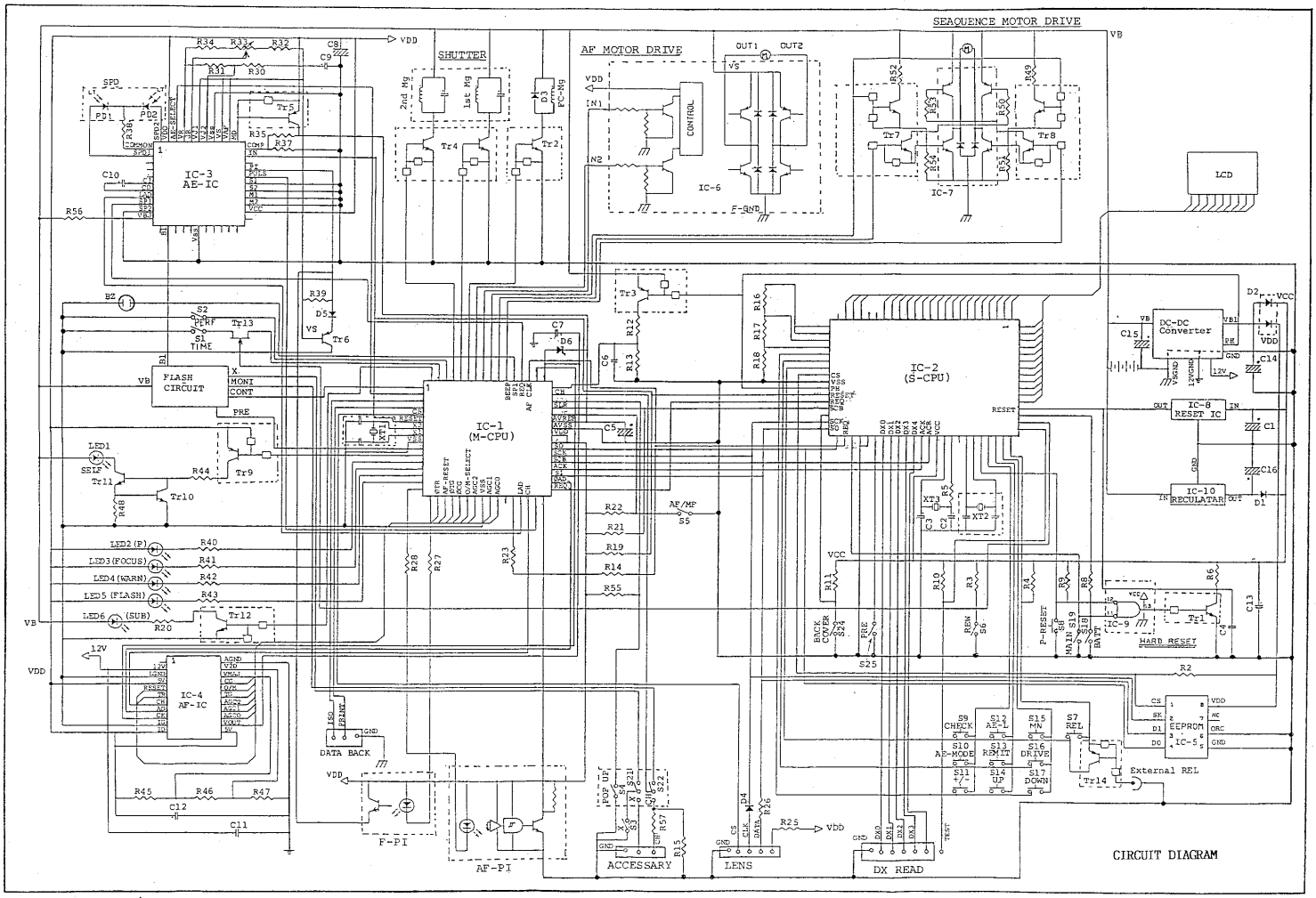
SWITCH FUNCTIONS

Symbol	Name	Function
S1	TIME	Timing SW "H"→"L": Mirror-up completed "L"→"H": Winding completed
S2	PERF	Perforation SW With film loaded, this switch, interlocked with the sprocket, outputs three or four pulses during one frame advance. (As a rule, this pulse is monitored to detect the presence of film.)
S3	X	Synchro SW of shutter
S4	POP UP	Flash pop-up SW "H": The flash is popped up. The built-in flash charge is started and then fired. "L": The flash is popped down. The built-in flash is not fired.
S5	AF/MF	AF/MF selector SW This switch selects the auto focus mode or manual focus mode. Switch OFF ("H"): Auto focus mode Switch ON ("L"): Manual focus mode
S6	REW	Rewind SW While pressing the rewind button, operate the lever to start rewind operation. The lever is locked until the back cover is opened.
S7	REL	Release SW "H": Release SW OFF "L": Release SW ON. Full press of the shutter release operates the Shutter.
S8	P-RESET	Program reset SW "H": Program reset SW OFF "L": Program reset SW ON At main SW ON Mode: Program, Drive: Single, F.range: Exposure Compensation:0 At main SW lock CPUs are reset.
S9	CHECK	Check SW This switch, turned on at half press of the release button, requests power application to eash circuit and light and distance metering operations. P.H. is kept for 16 seconds after release of the release button.

Symbol	Name	Function
S10	AE-MODE	AE mode SW This switch selects a shooting mode. Each press of the AE mode button changes the mode setting in rotation as shown.  However, the mode change is not performed under one of the following conditions: 1.The drive, AE-L or P-Reset button is being pressed. 2.Sequence of release, rewind or blank shot advance is being executed. 3.Check SW is turned on.
S11	+/-	Exposure compensation SW This switch sets exposure compensation valve. Each press of the +/- button changes the compensation value by 1/2 EV as shown below:  This change can also be performed by operating the U/D lever with the +/- button pressed.
S12	AE-L	AE-Lock SW This switch performs AE lock in Program, AV or TV mode. Slow synchro mode is set at flash.
S13	REMIT	Camera-to-subject distance selector SW Each press of the F.REMIT button changes the setting in rotation as shown below:  : AF in the range of 3m to infinity : AF in the range of closest point to 3m : AF in the range closest point to infinity
S14 S17	UP DOWN	Up SW for Up/Down lever. To right: Number increases. Down SW for Up/Down lever. To left: Number decreases. Mode M : Sets shutter speed. Aperture is set while pressing the MN button. Mode TV: Sets Shutter speed. Mode AV: Sets aperture. Operation is performed while pressing the +/- button for exposure compensation (±2EV).
S15	MN	AF lock/aperture value setting SW This switch locks AF operation at AF. In the mode M or AV, aperture stop down value can be changed by operating the Up/Down lever with the AF lock/ aperture value setting button pressed.

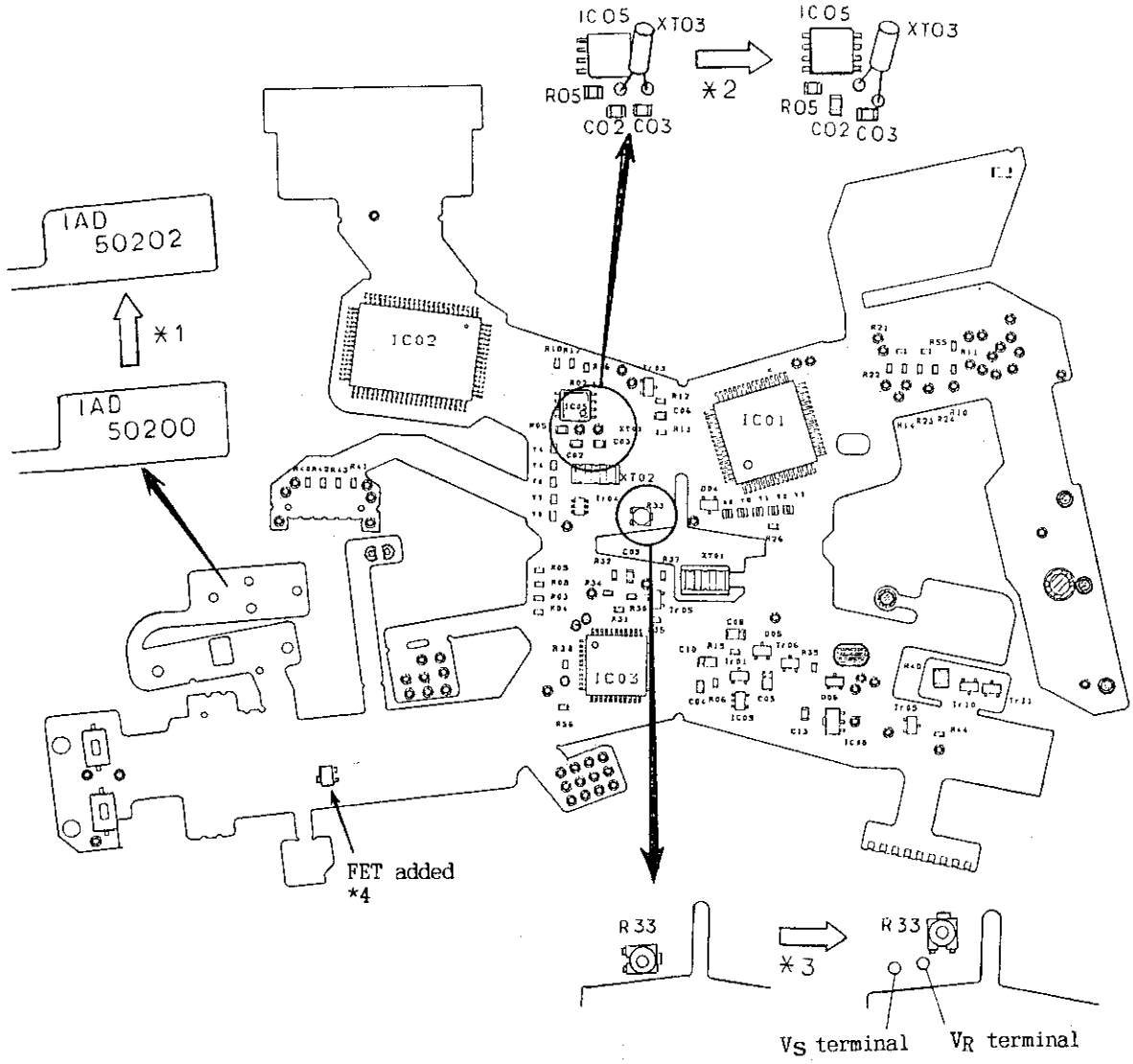
<table>
<tr><th>Symbol</th><th>Name</th><th>Function</th></tr>
<tr><td>S16</td><td>DRIVE</td><td>Drive SW
This switch sets a drive mode.
Each press of the drive mode switch changes the drive mode in rotation as shown below:
 

The following modes are set by combining the AF-MF with the drive mode:
<table><tr><th>Drive / AF-MF</th><th>Single</th><th>Continuous</th><th>Self</th><th>Trap focus</th></tr><tr><td>AF</td><td>SAF</td><td>CAF</td><td>SAF</td><td>CIF</td></tr><tr><td>MF</td><td>MF</td><td>MF</td><td>MF</td><td>CIF</td></tr></table></td></tr>
<tr><td>S18</td><td>BATT</td><td>Battery SW
Turn of the fixed key on the battery cover in the direction of " ⊖ " → " ⊖ " will turn the battery switch ON ("H").
Turn of the fixed key on the battery cover in the direction of " ⊖ " → " ⊖ " will turn the battery switch OFF ("L").
This switch detects the presence of the battery in the battery case. Turning-off the battery switch resets the CPU memory.</td></tr>
<tr><td>S19</td><td>MAIN</td><td>Main SW
This switch gets the camera ready for shooting.
Main SW ON : Camera operations are allowed.
Main SW Lock: Power is off.
(Set the main SW in this position when CPU is to be reset.)</td></tr>
<tr><td>S21</td><td>X</td><td>This switch selects built-in or external flash trigger switch.
The built-in flash trigger signal is selected at flash pop-up.</td></tr>
<tr><td>S22</td><td>CH</td><td>This switch selects built-in or external flash CH signal.
The built-in flash CH signal is selected at flash pop-up.</td></tr>
<tr><td>S24</td><td>BACK COVER</td><td>Back Cover SW
This switch detects the opening/closing of the Back Cover.
The Back Cover switch turns on at opening of the Back Cover and turns off at closing of the Back Cover. The film is advanced by three frames immediately after closing the Back Cover.</td></tr>
<tr><td>S25</td><td>PRE</td><td>Pre-flash selector SW
↯ Flash X
↯↯ Pre-flash + Flash X</td></tr>
</table>


SEAQUENCE MOTOR DRIVE
SHUTTER
AF MOTOR DRIVE
IC-3 AE-IC
IC-1 (M-CPU)
IC-2 (S-CPU)
IC-4 AF-IC
IC-5 EEPROM
IC-6 RESET IC
IC-7
IC-9
IC-10 RECULATAR
DC-DC Converter
FLASH CIRCUIT
LCD
F-PI
AF-PI
ACCESSARY
LENS
DX READ
DATA BACK
External REL
HARD RESET
CIRCUIT DIAGRAM

LIST OF MODIFIED PARTS

■In the course of production, the layout of the Main FPC was partially changed. The old Main FPC and the new one are interchangeable, but they are a little different in wiring.



*1. The old and the new Main FPC are identified by the part numbers.

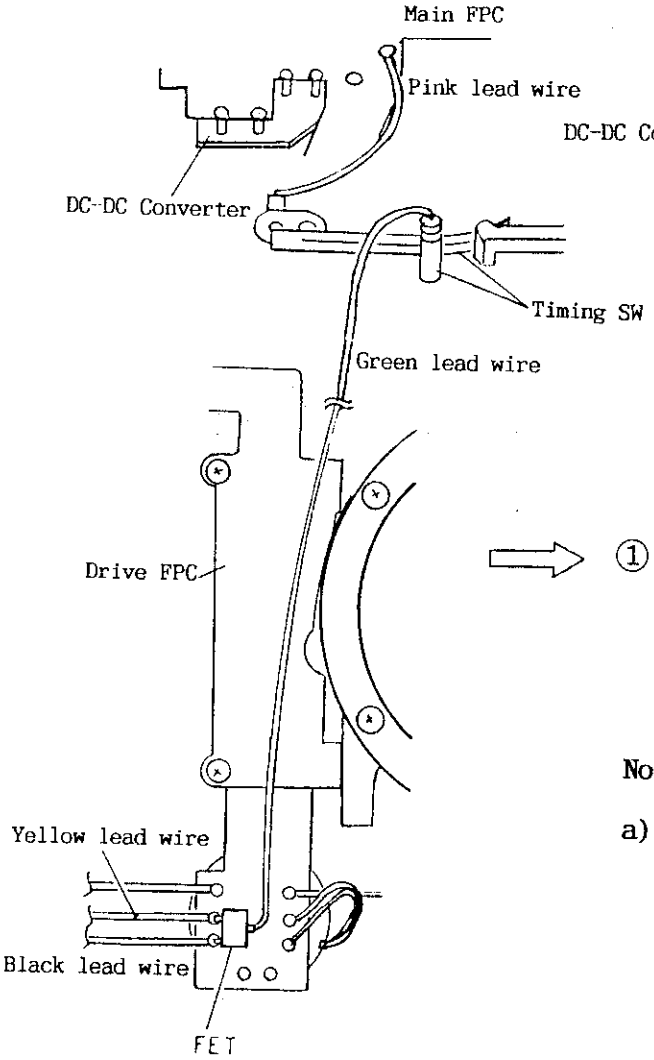
*2. The mounting position of XT03 (32KHz oscillator) is different.

*3. The position of the semifixed resistor (R33) is different and the test points V_R and V_S are added to the new FPC.

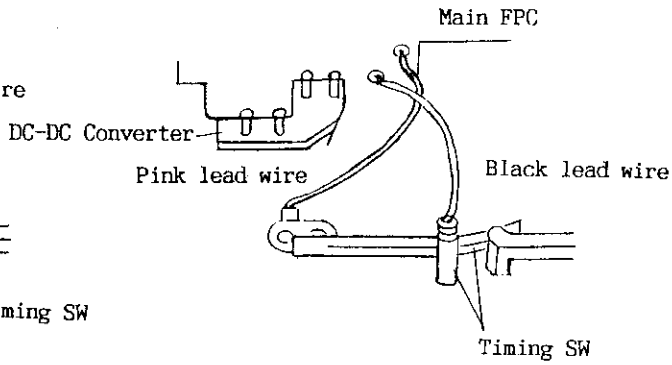
*4. FET is added to the new FPC.

[Connection of Lead Wires]

(Old Main FPC)



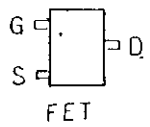
(New Main FPC)



① The timing SW is provided with a black lead wire instead of the green lead wire.
Its soldering position is different from that on the old main FPC.

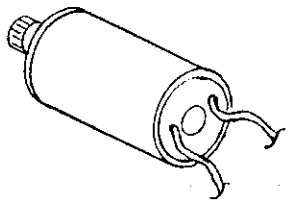
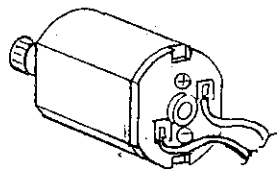
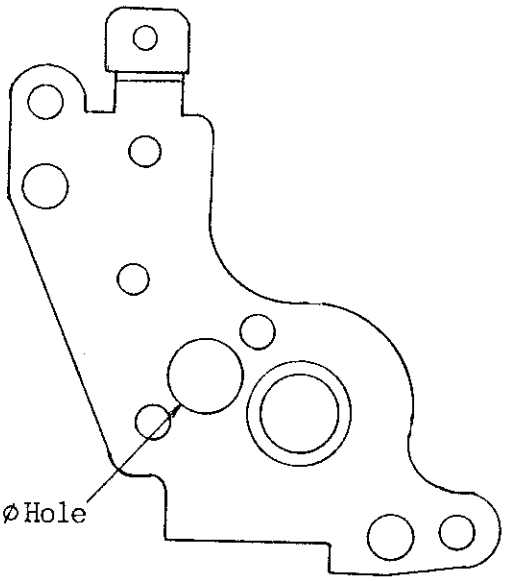
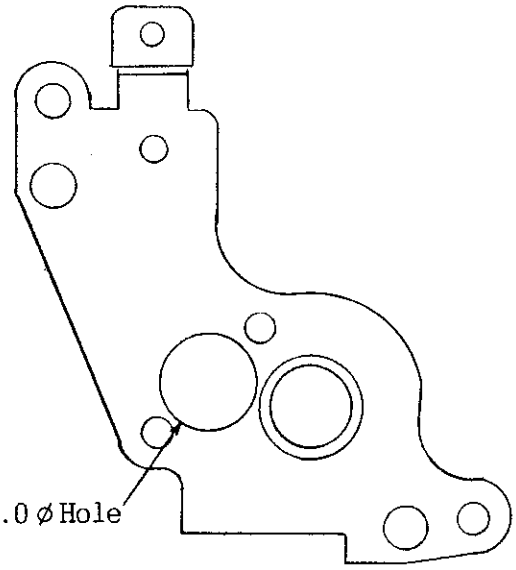
Note:

a) When the new main FPC is to be replaced, remove the FET from the drive FPC.
And unsolder the green lead wire of the timing SW at the drain terminal of the FET and solder it to the pattern of the main FPC.



■ Change of Driving Motor

In the course of production, the AF Driving Motor was changed from type A to type B. There are no AF driving motors of type A in stock. Therefore, type B only may be ordered.
When the AF Driving Motor of type A is to be replaced, replace the AF Driving Base Plate (A) and the AF Driving Motor Setscrews together.

Type A AF Driving Motor (16977200)	Type B AF Driving Motor (1AD77200)
	
Type A AF Driving Base Plate (A) (1AD77420)	Type B AF Driving Base Plate (A) (1AD76910)
	
Type A AF Driving Motor Setscrew (61912526)	Type B AF Driving Motor Setscrew (63902026)
Class 1 pan head machine screw M 1.7 2.5 long	Class 3 pan head machine screw M 1.4 2.0 long

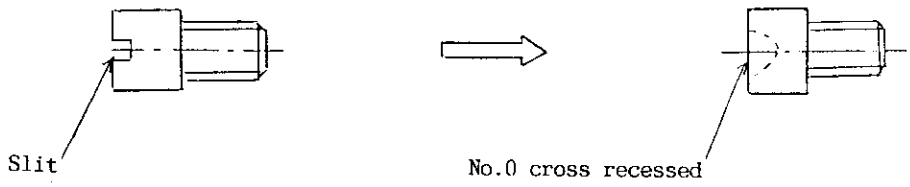
■ Change of S.B Stopper and S.Base Shaft (Left)

The S.B Stopper and S.Base Shaft (Left) were modified in shape for easy screwing.

[S.B Stopper]

Old S.B Stopper
(1AD22900)

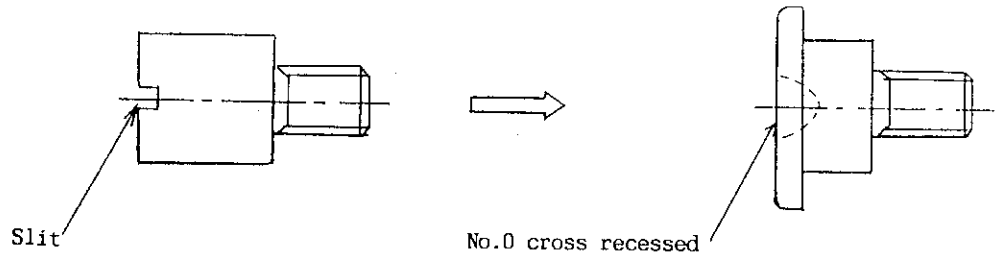
New S.B Stopper
(1AD22910)



[S.Base Shaft (left)]

Old S. Base Shaft (left)
(1AD22800)

New S. Base Shaft (left)
(1AD22810)



B DISASSEMBLY PROCEDURE

B-1 Removal of Exterior Parts

B-1-1 Removeal of Back Cover Ass'y

1)Open the Back Cover Ass'y (169A7100) and remove it by pushing down the back cover mounting/ removal pin.

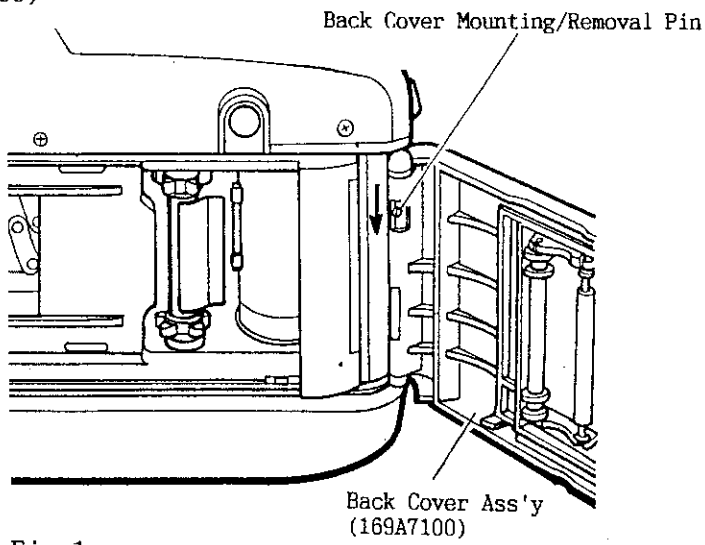


Fig.1

B-1-2 Removal of Bottom Cover Ass'y

1)Using a coin, the Battery Cover lock key on the camera bottom can be turned in the direction of the arrow as shown in Fig.2.
Adjust the "▬" mark of the Battery Cover lock key to the "ℭ" mark and remove the Battery Cover Ass'y (1ADAD700).

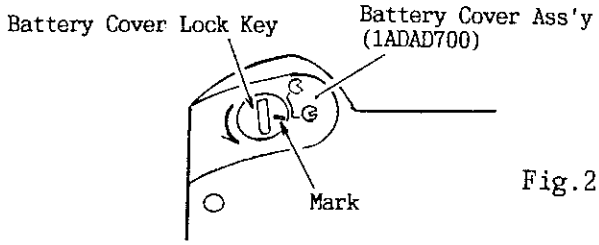


Fig.2

2)Remove the Battery (2CR5).

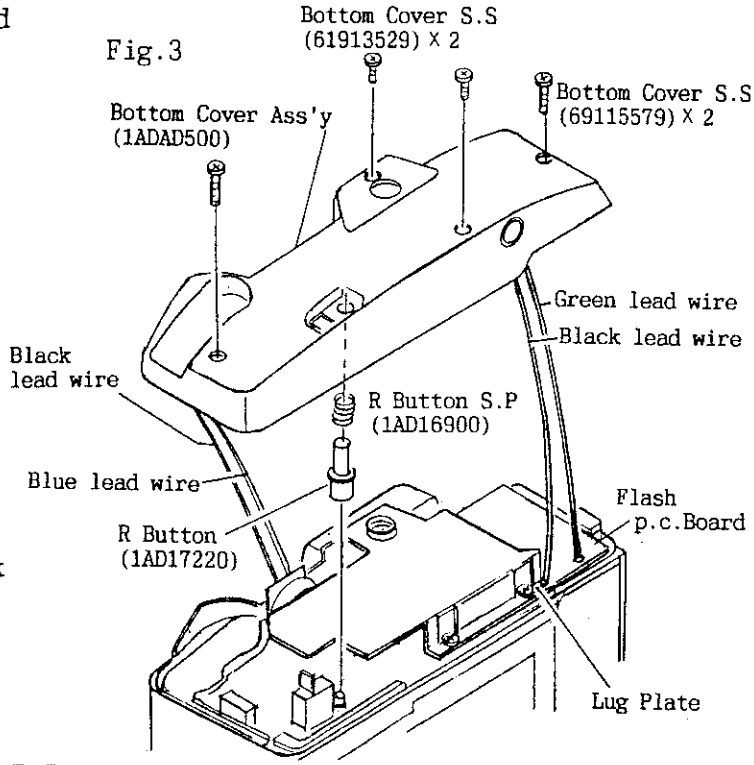
3)Remove the Bottom Cover Setscrews (61913529) X 2 and (69115579) x 2.

4)Lift up the Bottom Cover Ass'y (1ADAD500) and remove the R Botton spring (1AD16900) and R Butoon (1AD17220).

5)Unsolder the green lead wire on the Flash P.C Board and the black lead wire on the lug plate.

6)On the Drive FPC, unsolder the black and blue lead wires coming from the Battery Switch.

Fig.3



Notes:

a) Never touch the Flash P.C Board.
Touching it is dangerous, because a high voltage is being applied to the flash capacitor.
Discharge the flash capacitor using a tool.

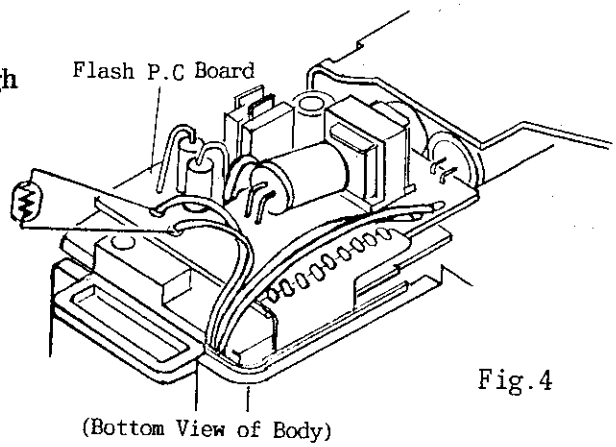


Fig.4

B-1-3 Removal of Front Cover Ass'y

1) Remove the Cartridge Holder Spring Setscrew (69115579) and Cartridge Holder Spring (16810612).

2) Peel off the Grip (1AD24900).

3) Remove the Front Cover Setscrews (61915026) X 2 and (61913529) X 4 and the Front Cover Ass'y (1ADAD400).

4) When removing the Front Cover Ass'y, the Lens Release Button (16823710) will come off.

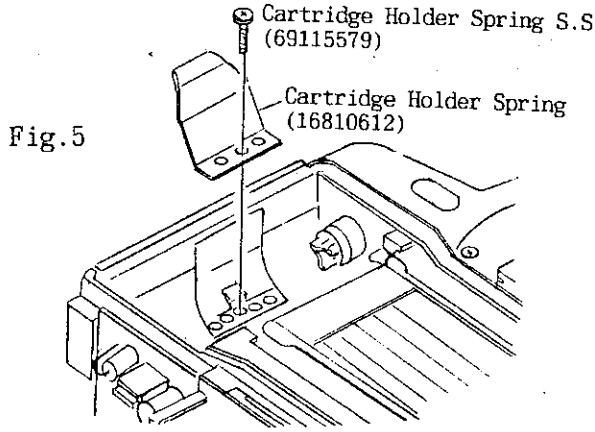
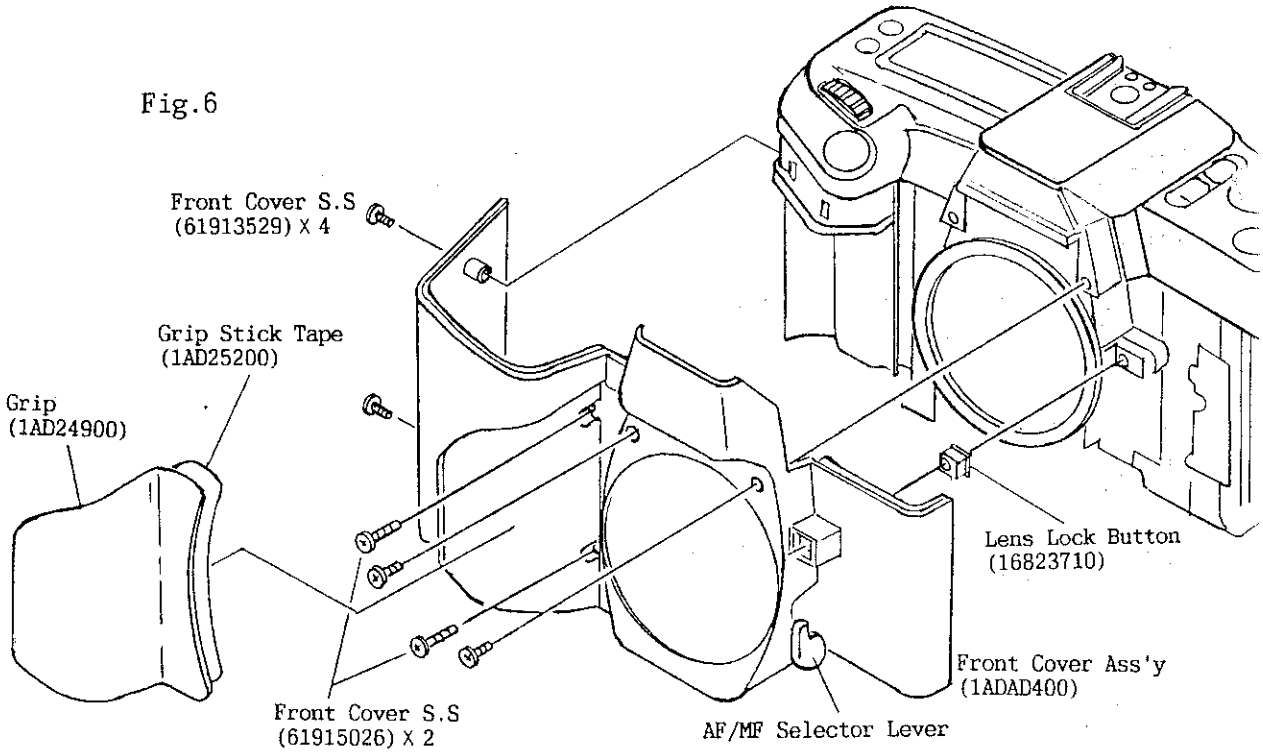


Fig.5

Fig.6



Notes:

a) Set the AF/MF Selector Lever to AF when removing or installing the Front Cover Ass'y.

B-1-4 Removal of Top Cover Ass'y

1)On the Flash P.C Board, unsolder the black (old)/ gray (new) and orange lead wires coming from the Top Cover.

2)On the Flash Base, unsolder the orange, red and black lead wires coming from AF-FPC.

3)Unsolder the 9 soldered joints between the Flash P.C Board and the Top Cover FPC.

4)Peel off the two Acetate Cloth Tapes holding the lead wires.

5)Remove the Body Connector Retaining Plate Setscrews (69215576) X 3, Body Connector Retaining Plate (16817000) and Body Connector Rubber (16817100).

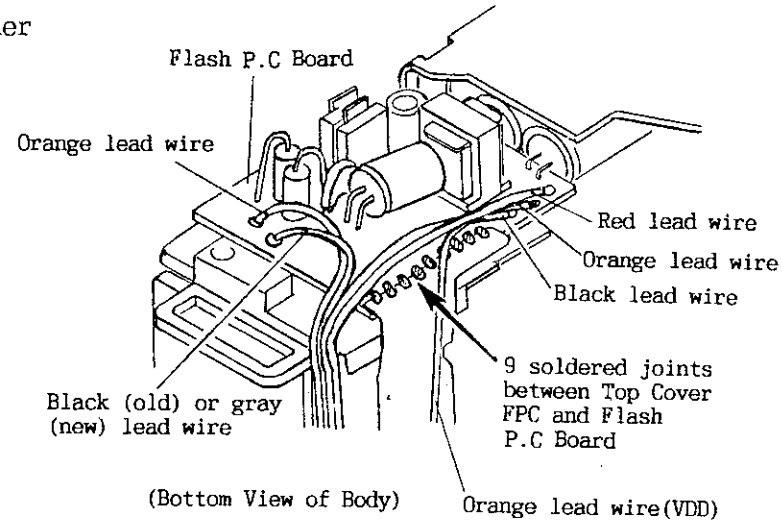

Flash P.C Board
Orange lead wire
Red lead wire
Orange lead wire
Black lead wire
9 soldered joints between Top Cover FPC and Flash P.C Board
Black (old) or gray (new) lead wire
(Bottom View of Body)
Orange lead wire(VDD)

Fig.7

6)Remove the Top Cover Setscrews (69113079) X 4 and (69114076).

7)Unsolder the green lead wire while lifting up the Top Cover Ass'y (1ADAD600).

)Unsolder the black lead wire (coming from the shoe Reinforcement Board on the Top Cover) on the SPD Board and remove the Top Cover Ass'y. (See Fig.14)

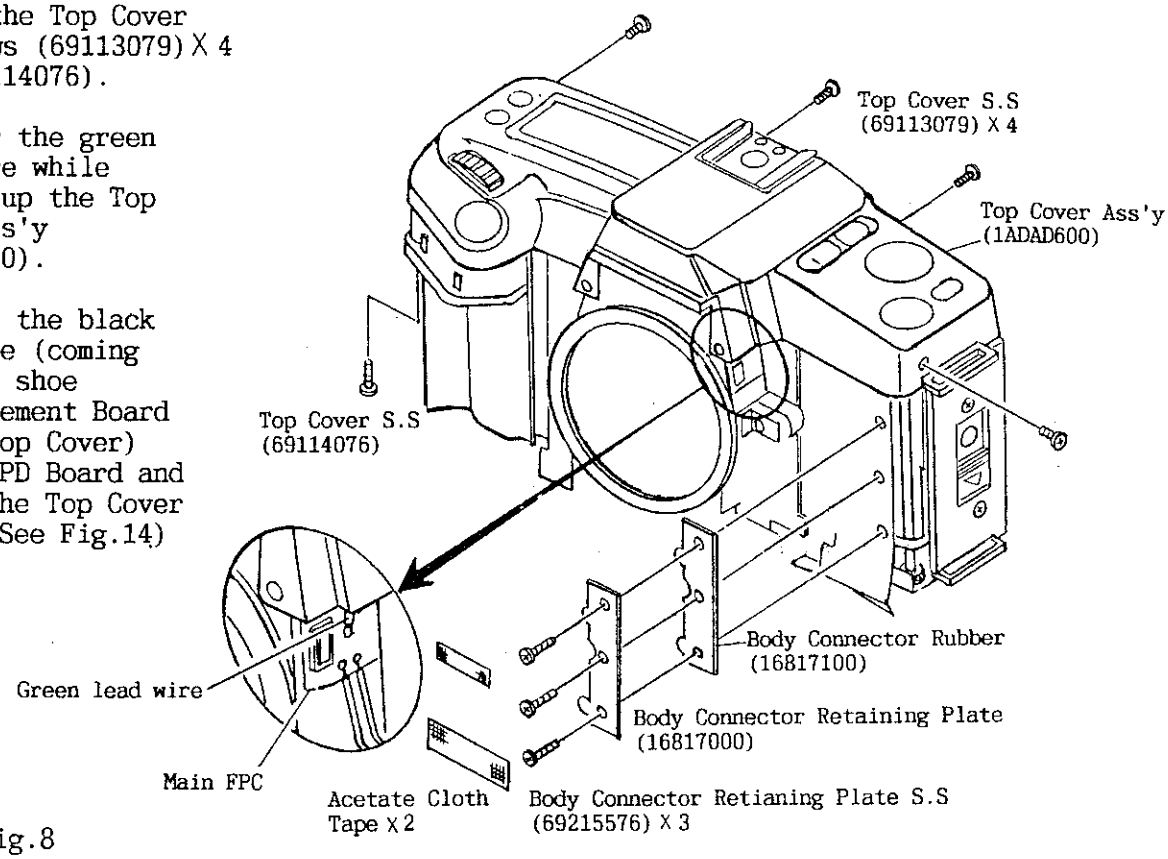

Top Cover S.S (69113079) X 4
Top Cover Ass'y (1ADAD600)
Top Cover S.S (69114076)
Body Connector Rubber (16817100)
Green lead wire
Body Connector Retaining Plate (16817000)
Main FPC
Acetate Cloth Tape X 2
Body Connector Retianing Plate S.S (69215576) X 3

Fig.8

B-2 Removal of Flash P.C Board Ass'y

B-2-1 Removal of Flash P.C Board Ass'y

1)Peel off the Acetate Cloth Tape.

2)Remove the Flash P.C. Board Ass'y Setsscrews (69113076) X 2 and then remove the Flash P.C. Board Ass'y (1ADAB180) in the direction of the arrow.

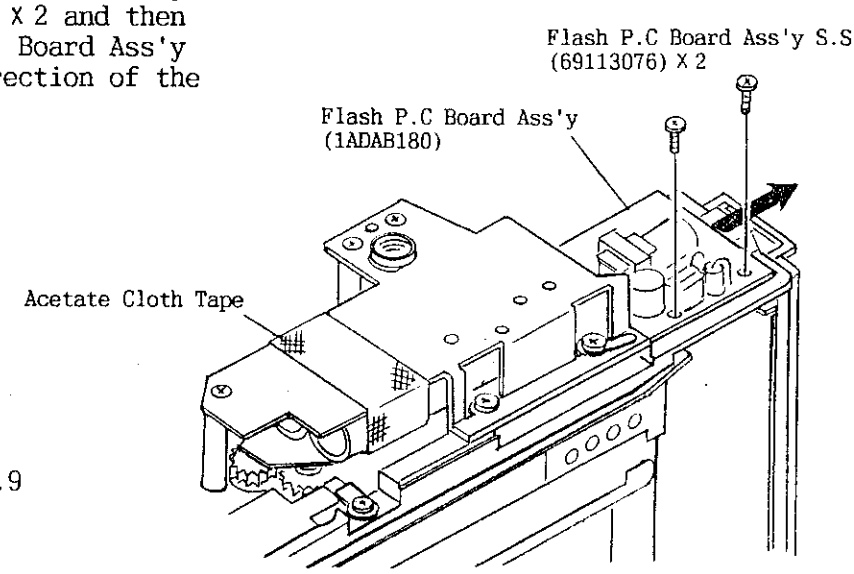


Fig.9

B-3 Removal of Main FPC Ass'y

B-3-1 Removal of Main FPC Ass'y

1)Unsolder the soldered joints on the Main FPC.

2)Raise the Main FPC in the direction of the arrow Ⓐ and then unsolder the red lead wire (coming from the Drive FPC).

3)Unsolder the black and red lead wires (coming from AF-FPC).

4)Release the pattern portion of the Main FPC by sliding it in the direction of the arrow Ⓑ.

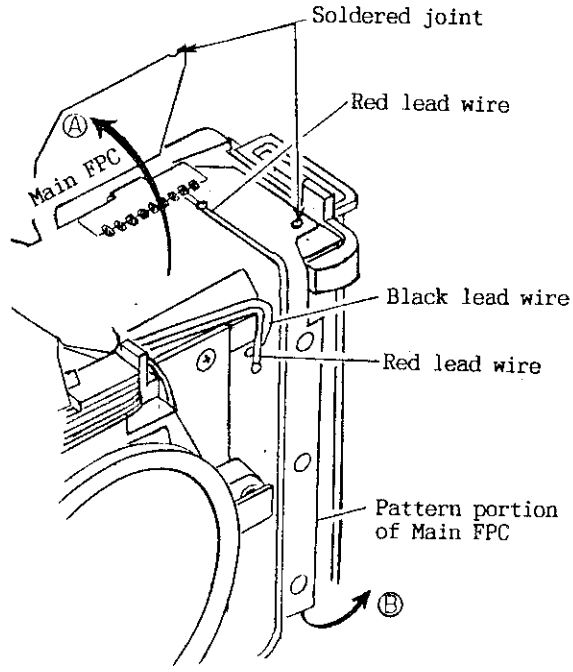


Fig.10

5)Raise the Main FPC in the direction of the arrow Ⓐ and move the white bakelites of the connector in the direction of the arrow Ⓑ. Move the connection portion of the Main FPC in the direction of the arrow Ⓒ and remove it from the Connector.

6)Unsolder the green lead wire (coming from the X Contact).

7)Unsolder the gray and black lead wires (coming from the MAF Contact).

8)Remove the Main FPC Setscrew (61912222) and peel off the portion Ⓓ of the Main FPC. (The portion Ⓓ is attached with Double Stick Tape.)

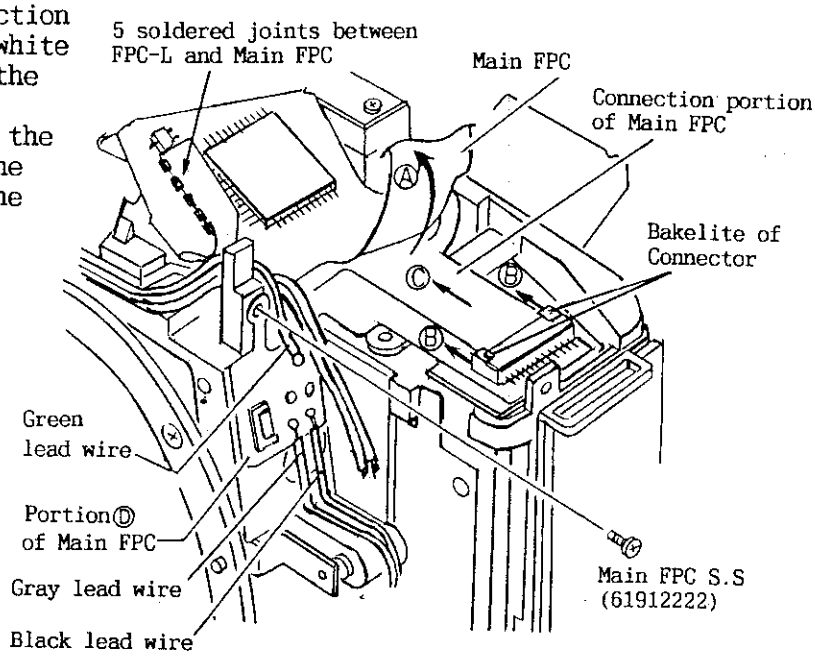

5 soldered joints between FPC-L and Main FPC
Main FPC
Connection portion of Main FPC
Bakelite of Connector
Green lead wire
Portion Ⓓ of Main FPC
Gray lead wire
Black lead wire
Main FPC S.S (61912222)

Fig.11

Notes:

a) **When the connection portion of the Main FPC is to be removed from the Connector, take care that the soldered joints of the connector terminals are not broken.**

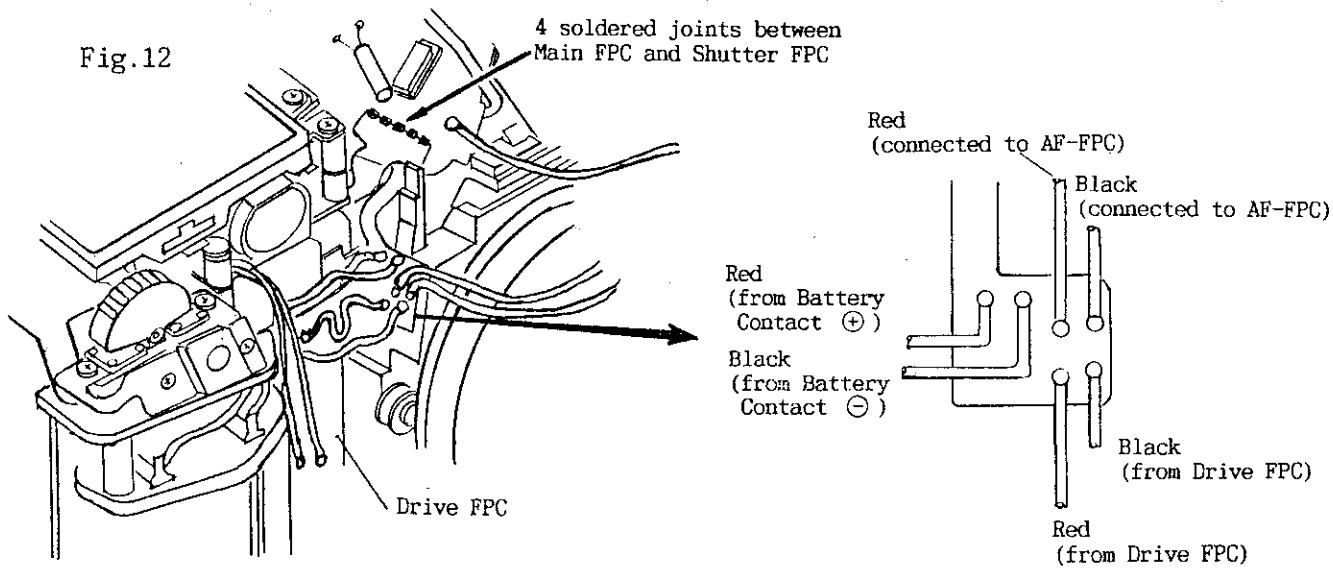
9)Unsolder the 5 soldered joints between the FPC-L and the Main FPC.

10)Unsolder the 4 soldered joints between the Shutter FPC and the Main FPC.

11)Unsolder the red and black lead wires (coming from the ⊕ and ⊖ terminals of the Battery Contact).

12)Unsolder the red and black lead wires (coming from the Drive FPC).

Fig.12


4 soldered joints between Main FPC and Shutter FPC
Drive FPC
Red (connected to AF-FPC)
Black (connected to AF-FPC)
Red (from Battery Contact ⊕)
Black (from Battery Contact ⊖)
Black (from Drive FPC)
Red (from Drive FPC)

13)Peel off the black tape.

14)Unsolder the 5 soldered joints between the F.Indicator LED and the Main FPC.

Notes:

a) Instead of removing the black tape and unsoldering the soldered joints between the F.Indicator LED and the Main FPC, the LED and the Main FPC may be removed together by removing the two F. Indicator LED Setscrews. When the LED is to be reinstalled, however, the position of the LED must be adjusted.

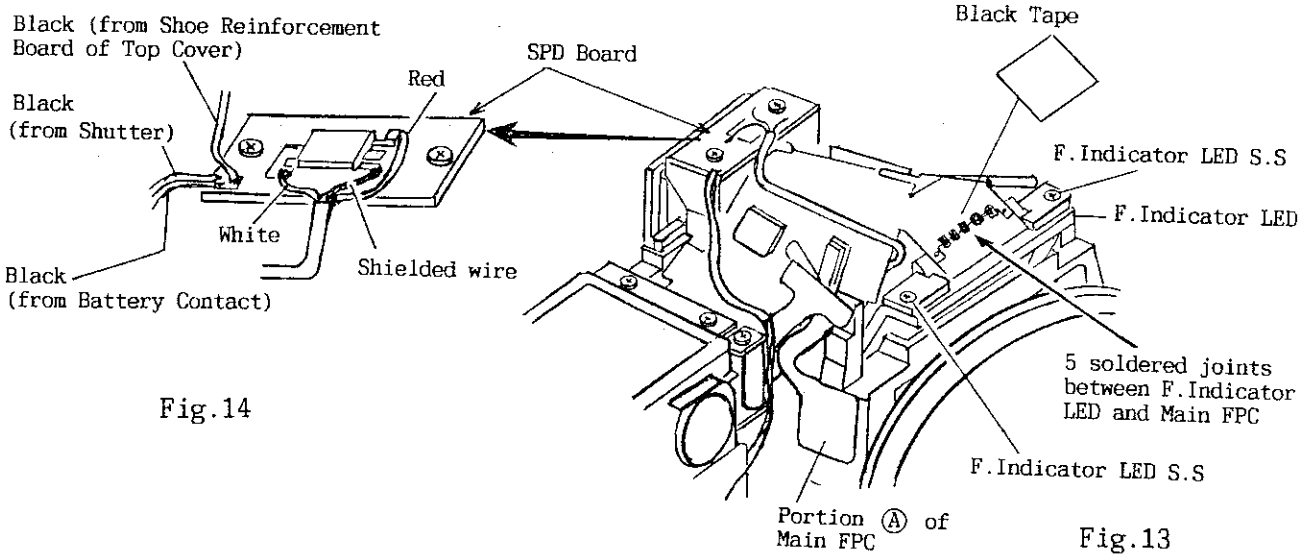


Fig.14

Fig.13

15)Unsolder the white and red lead-wires and the shielded wire on the SPD Board.

16)On the SPD Board, unsolder the two black lead wires coming from the Shutter and the Battery Contact.

17)Peel off portion Ⓐ of the Main FPC.

Notes:

a) The portion Ⓐ is attached to the Mirror Box with Double Stick Tape. In peeling it off, take care not to break the pattern on the Main FPC.

18)Remove the LCD Holder Setscrews (61912026) X 3 and raise the LCD Panel in the direction of the arrow.

19)Remove the Main FPC Setscrew (66001070).

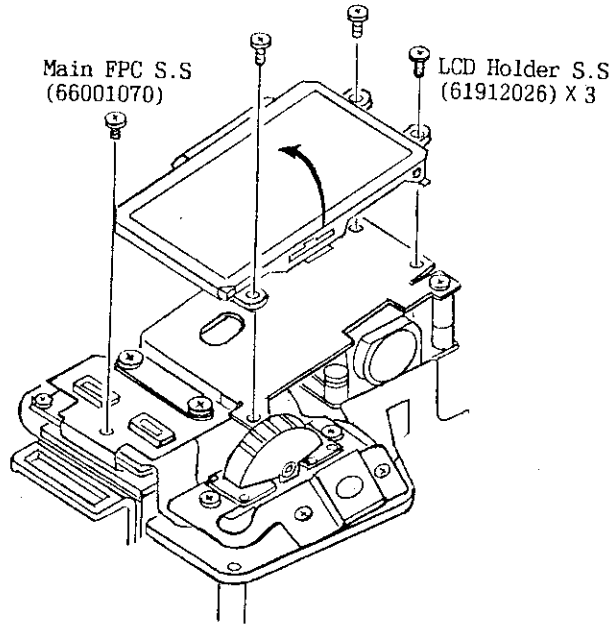


Fig.15

20) Remove the ISO Connector Plate Setscrews (66001023) X 2 and take off the ISO Connector Plate (1AA58000), FPC Connector Rubber (1AD17500), Main FPC, Drive FPC and S. Insulation Sheet (1AD59900).

21) Remove the LCD Base Plate Setscrews (69113076) X 2 and (61912026) and then the LCD Base Plate Ass'y (1ADAD910).

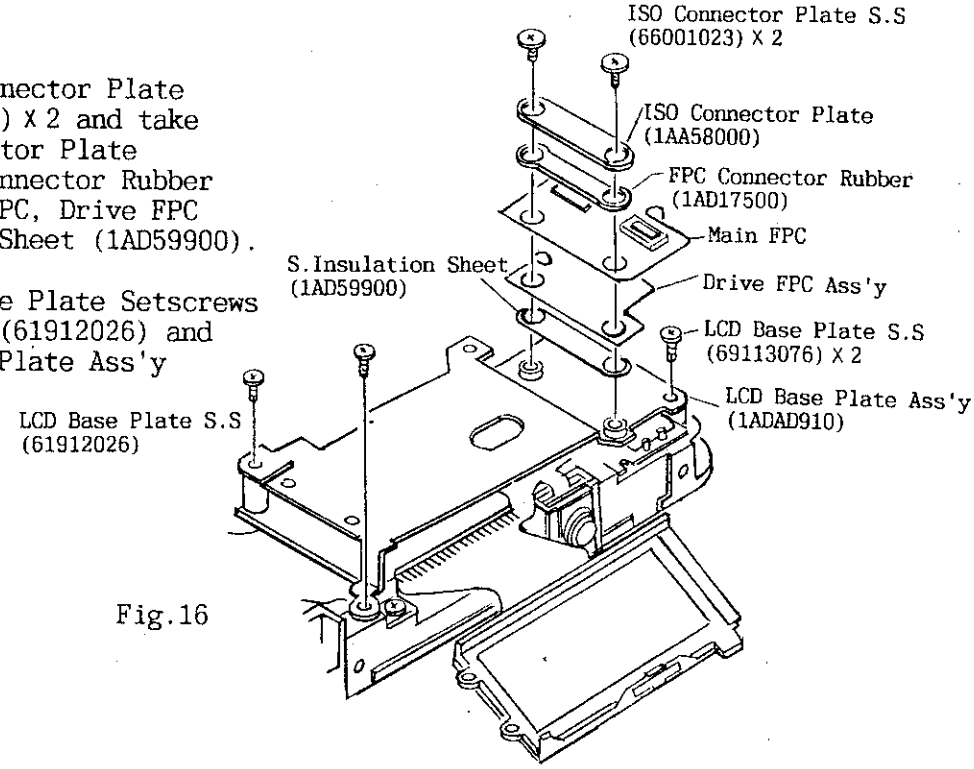


Fig.16

22) Unsolder the 2 soldered joints between the Main FPC and the AF Auxiliary Light LED.

23) Remove the AF Auxiliary Light Ass'y Setscrews (61912026) and (66001023) and take off the AF Auxiliary Light Ass'y (1ADAD900).

24) Remove the S-CPU Supporter Setscrew (69113076) and the S-CPU Suppporter (1AD17300).

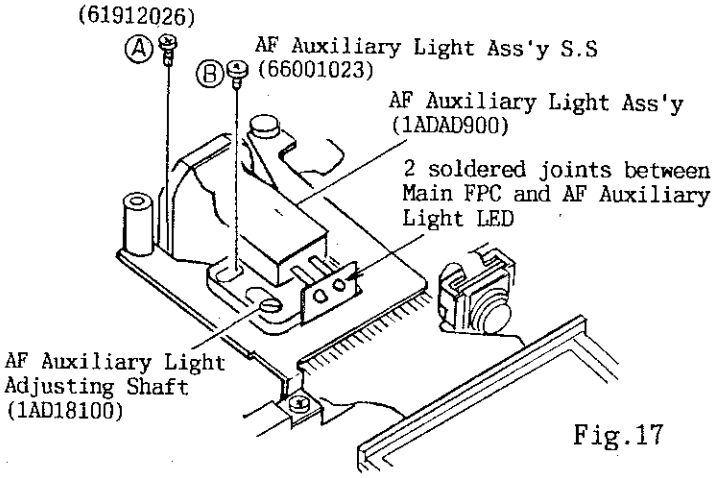


Fig.17

Notes:

a) Instead of unsoldering the soldered joints between the Main FPC and the AF Auxiliary Light LED and removeing the AF Auxiliary Light Ass'y Setscrew Ⓑ, the AF Auxiliary Light Ass'y, S-CPU Supporter and Main FPC Ass'y may be removed together by removing the AF Auxiliary Light Ass'y Setscrew Ⓐ and S-CPU Supporter Setscrew. In this case, there is no need of adjusting the position of the AF Auxiliary Light Ass'y. When the AF Auxiliary Light Ass'y is taken off, the position must be adjusted at reinstallation.

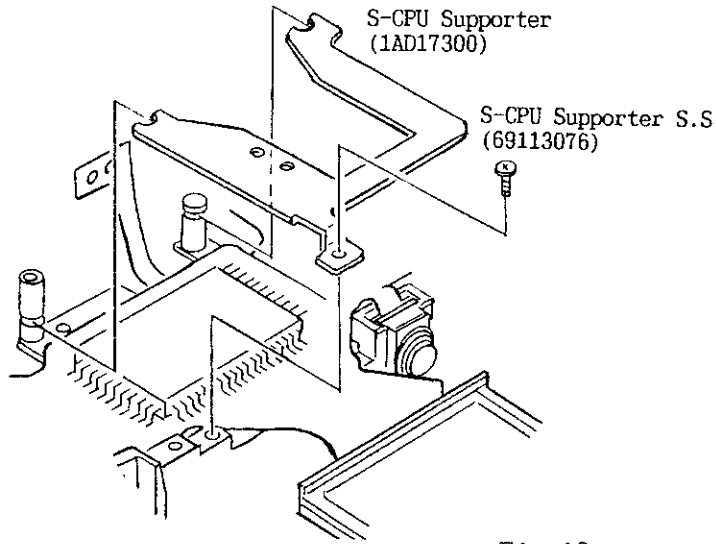


Fig.18

25)Unsolder the pink and black lead wires (coming from Timing SW).

26) Carefully pull out the AE Lock SW portion of the Main FPC. (See Fig.20)

[Notes on Reassembly of AE Lock SW portion of Main FPC]

a) In reinstalling the AE Lock SW portion of the Main FPC, take care that the AE Lock Switch is not rolled in to the side of the Main FPC.

b) In bending the AE Lock SW portion of the Main FPC, take care not to break the Main FPC.

Fig.20

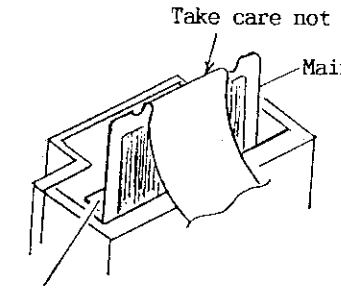
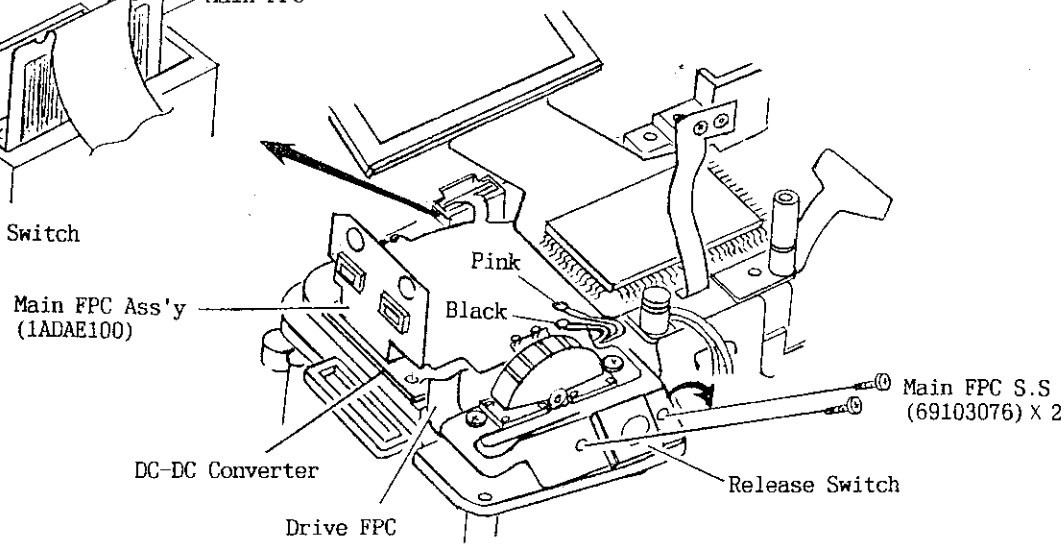


Fig.19



27)Remove the Main FPC S.S (69103076) X 2 securing the Release the Release SW portion.

28)Raise the Main FPC in the direction of the arrow and remove the Up/ Down Knob Base Setscrews (69114076) X 2 and the Up/ Down Knob Base.

29)Remove the Main FPC Ass'y (1ADAE100).

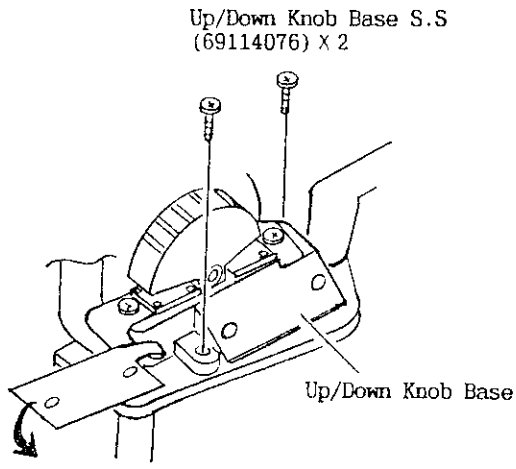


Fig.21

B-4 Removal of Drive FPC Ass'y

B-4-1 Removal of Drive FPC Ass'y

1)Unsolder the red and blue lead wires (coming from Winding Motor) and the orange lead wire (coming from Constant-Voltage IC).

2)Unsolder the gray, yellow and black Lead wires (coming from Winding Base Plate).

3)Remove the Drive FPC Setscrews (63911526) X 2.

4)Raise the Drive FPC in the direction of the arrow and tighten the upper Drive FPC Setscrew provisionally.

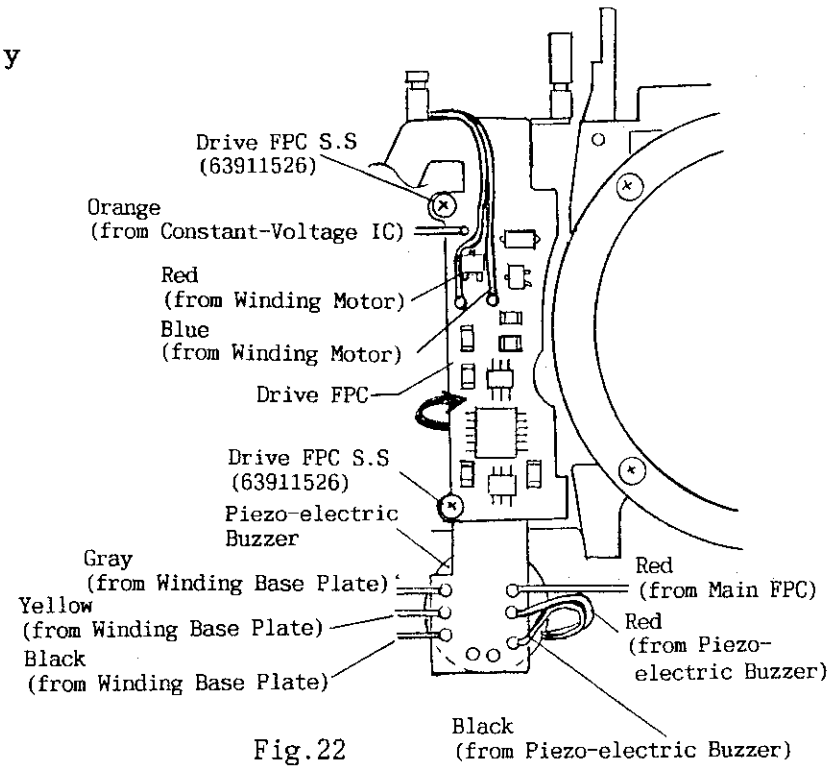


Fig.22

5)Unsolder the red and black lead-wires (coming from FC Mg).

6)Unsolder the 3 soldered joints between the AF PI-FPC and the Drive FPC.

7)Remove the provisionally tightened Drive FPC Setscrew and take off the Drive FPC Ass'y (1ADAE120).

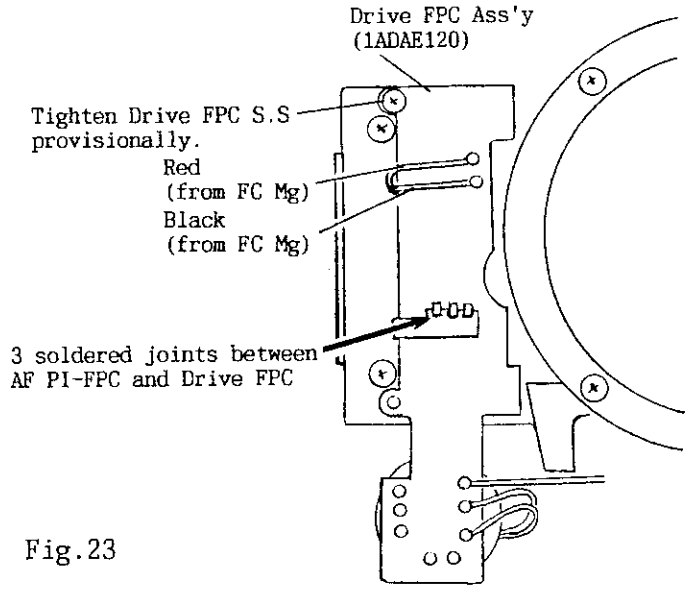


Fig.23

B-5 Removal of Tripod Socket Base Plate Ass'y

B-5-1 Removal of Tripod Socket Base Plate Ass'y

1) Remove the Tripod Socket Base Plate Setscrews (61823526) X 3 and (69323576) X 2.

2) Remove the Tripod Socket Base Plate Ass'y (1ADAD300).

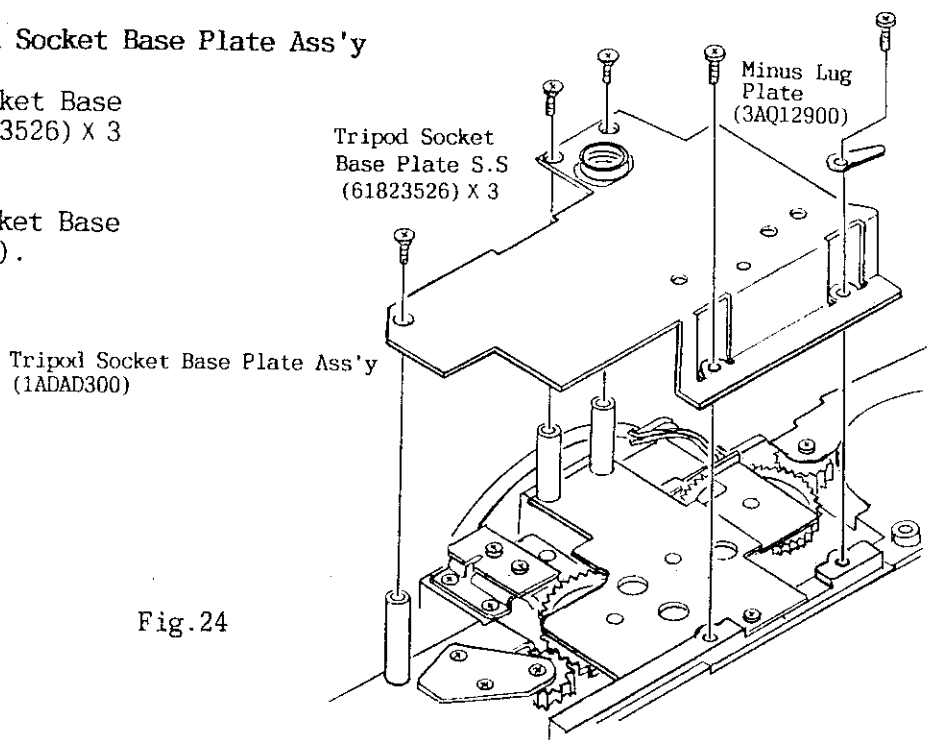


Fig.24

B-6 Removal of Mirror Box Ass'y

B-6-1 Removal of RW Gear Base Plate Ass'y

1) Remove the Tripod Socket Base Plate Shafts (1AD19010) X 2.

2) Remove the RW Gear Base Plate Ass'y Setscrew (69113076) and take off the RW Gear Base plate Ass'y (1ADAE800).

[Notes on Reassembly of RW Gear Base Plate Ass'y]

a) In reinstalling the RW Gear Base Plate Ass'y, take care not to pinch the gray and black lead-wires (from AF Motor) between the Mirror Box and RW Gears.

b) After installing the RW Gear Base Plate Ass'y, make sure that the RW Gears rotate smooth.

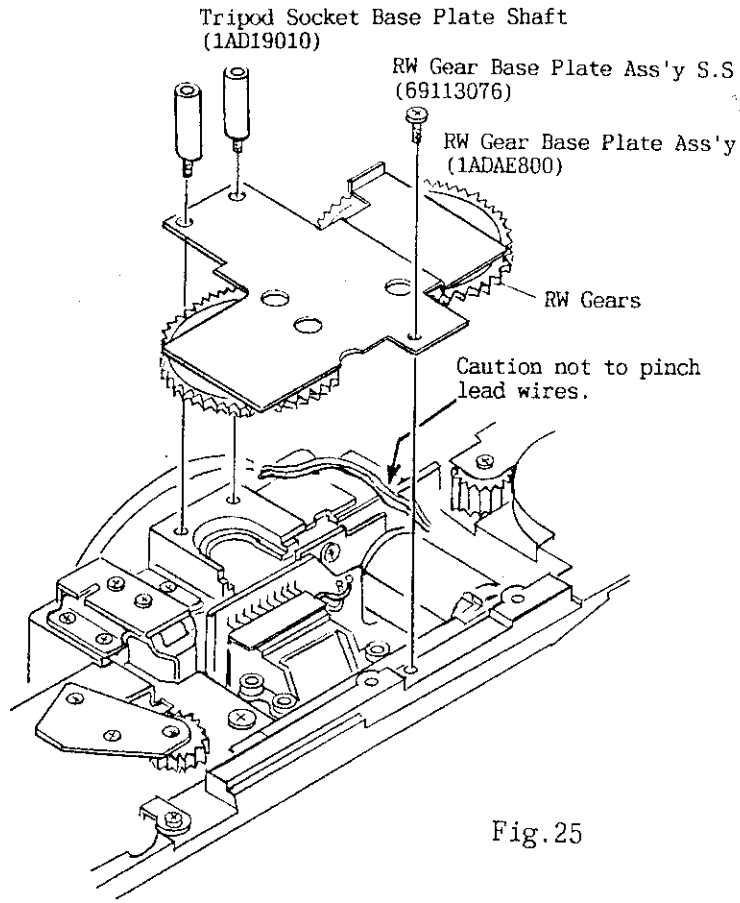


Fig.25

B-6-2 Removal of F. Gear Ass'y

1) Insert a pin in the hole of the F. Gear Ass'y (168A3200).

2) Remove the F. Gear Holder Ass'y Setscrews (61812526) X 3 and take off the F. Gear Ass'y.

3) Remove the Winding Base Plate Setscrew (16863300).

B-6-3 Removal of Mirror Box Ass'y

1) Remove the Mirror Box Setscrews (69224576) X 4.

2) Remove the Eye-piece Frame Setscrews (69113576) X 2 and the Eye-piece Frame (17320500).

3) Remove the Mirror Box Setscrews (63926526) X 2.

4) Peel off the AF-FPC.

5) Remove the Mirror Box Ass'y (1ADAB000).

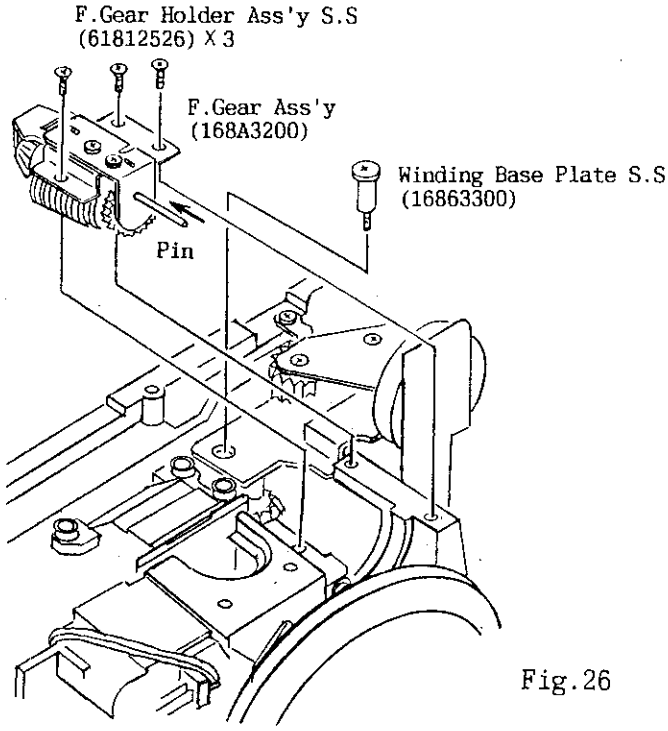


Fig.26

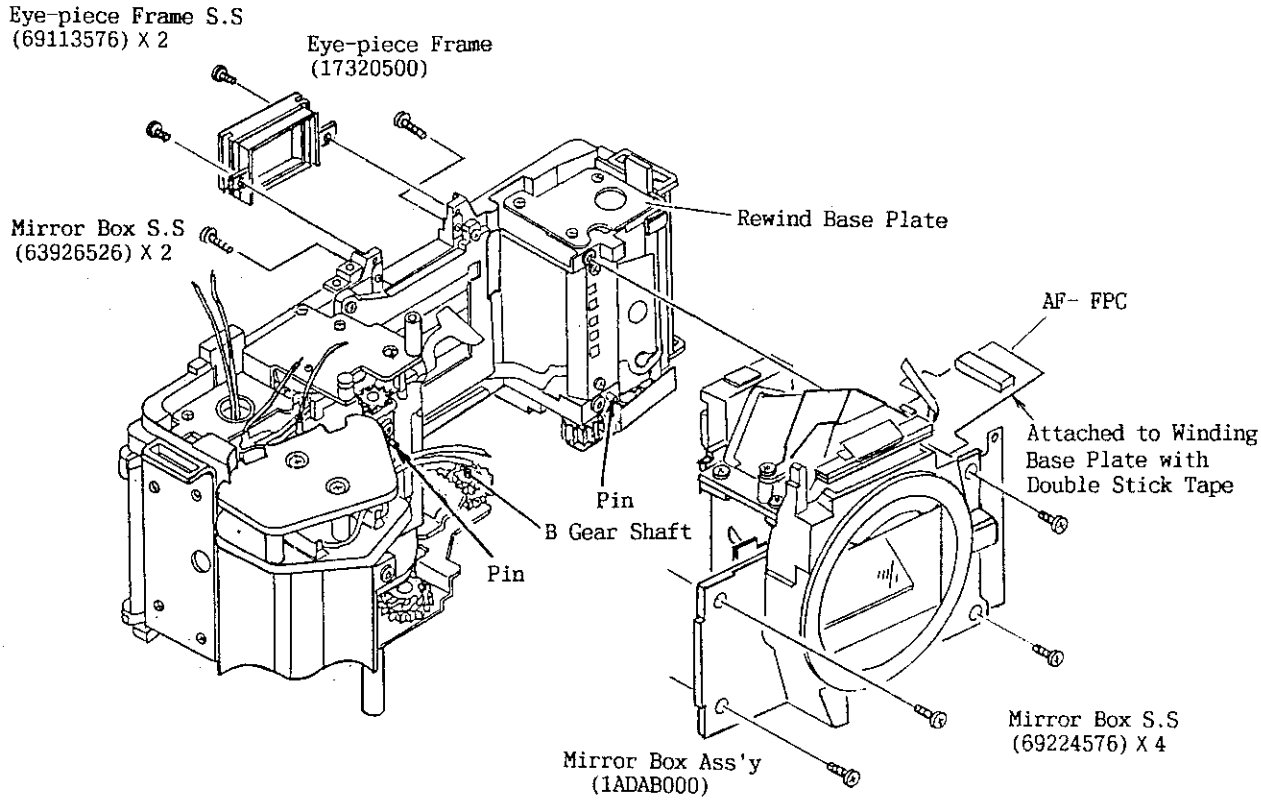


Fig.27

Notes:

a) The AF FPC is attached to the Rewind Base Plate with Double Stick Tape. In peeling it off, take care not to break the AF FPC.

b) In removing the Mirror Box Ass'y, take care not to break the two pins of the Body. (See Fig.27)

C) The B Gear Shaft is inserted in the hole in the bottom of the Mirror Box Ass'y. Therefore, lift up the Mirror Box a little and remove the Mirror Box Ass'y toward the front. (See Fig.27)

B-7 Removal of Winding Base Plate Ass'y

B-7-1 Removal of Winding Base Plate Upper Ass'y

1)Remove the AE Lock Case Setscrew (69113076).

2)Remove the AE Lock Case (1AD12610), AE Lock Switch (1AD12700) and AE Lock Button (1AE12500).

[Notes on Reassembly of AE Lock Case]

a) Insert the pin of the AE Lock Case in the hole of the AF Lock Switch and install the AE Lock Case on the Boby. (See Fig. 28)

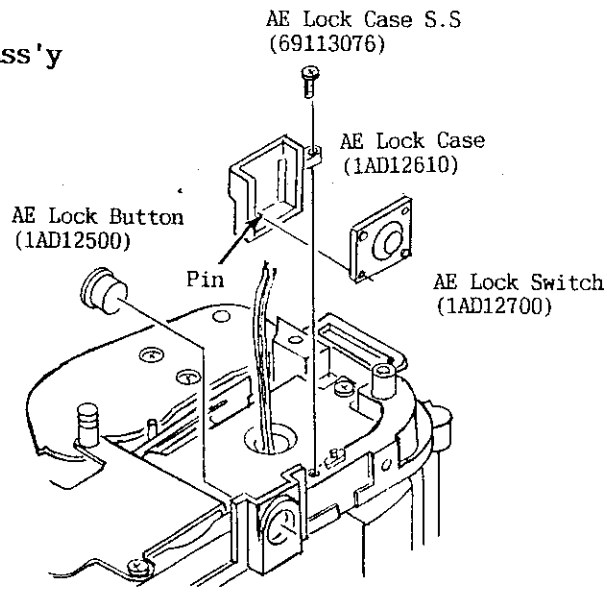


Fig.28

3)Move the Limit Lever in the direction of the arrow and while holding the W Shaft Gear (2) with tweezers or a screwdriver, turn and remove the W Shaft Gear (2) Setscrew (66001042).

Notes:

a) In moving the Limit Lever, take care not to bend the contact of the Timing Switch.

4)Remove the Winding Base Plate Upper Ass'y Setscrews (69113076) X 2 and take off the Winding Base Plate Upper Ass'y (1ADAA400).

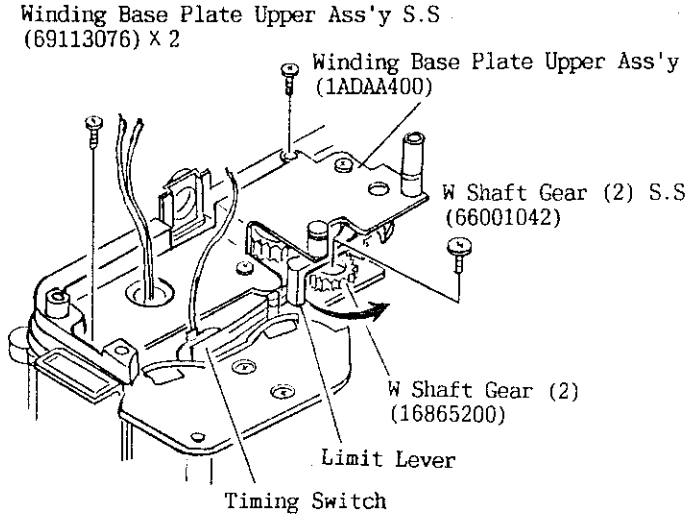


Fig.29

B-7-2 Removal of Sprocket

1)Remove the Film Guide Holder Ass'y Setscrews (69113576) X 2 and the Film Guide Holder Ass'y (168A3100).

2)Remove the Sprocket (16865510) and the P. Switch Ring (16867400).

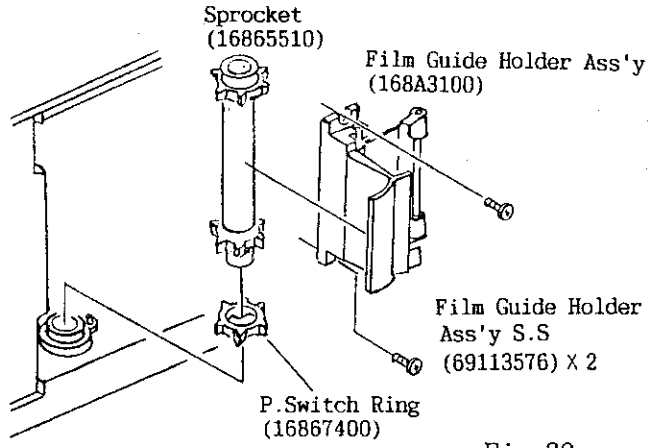


Fig.30

B-7-3 Removal of Winding Base Lower Ass'y

1)Remove the Winding Base Plate Lower Ass'y Setscrews (69113076) X 3.

2)Release the gray and black lead wires glued in the groove of the Body with care not to break them.

3)Remove the Winding Base Plate Lower Ass'y (1ADAA300) while pushing the R. Change Release Lever with a screwdriver or like tool.

4)Remove the Spool Ass'y (169A2000).

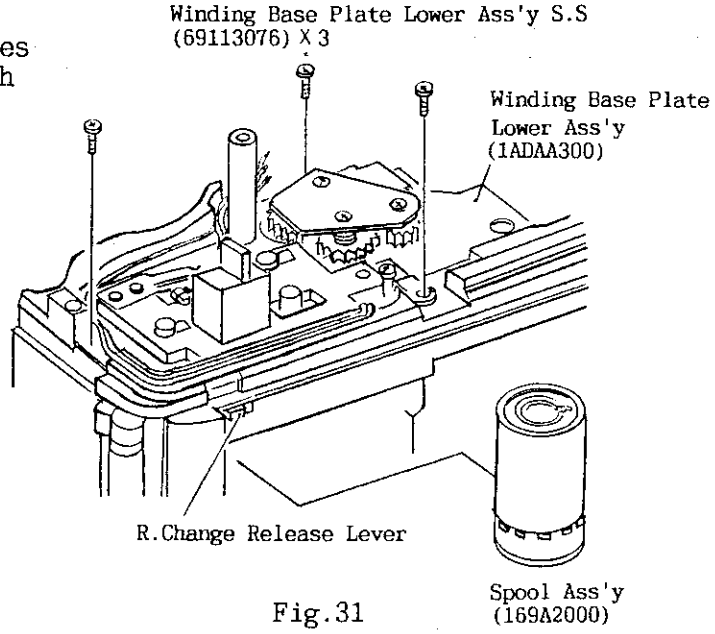


Fig.31

[Notes on Forming of Lead Wires]

a) Glue the gray and black lead wires in the groove of the Body so that they do not overlie each other.

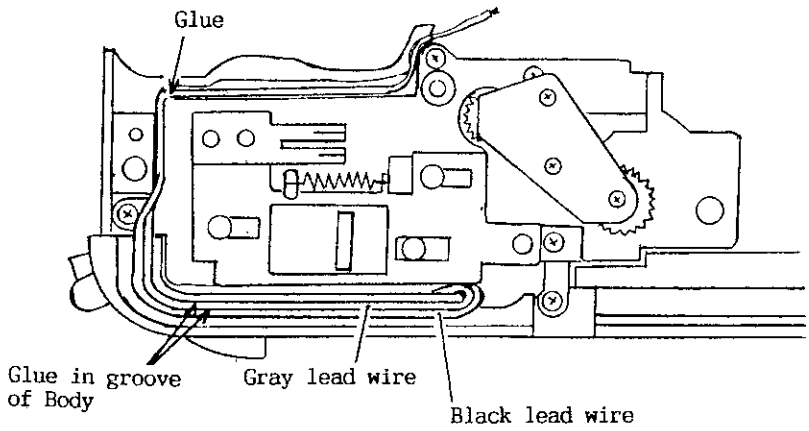


Fig.32

B-8 Removal of Shutter Ass'y

B-8-1 Removal of Shutter Ass'y

* The Shutter Ass'y can not be removed without removing the Mirror Box Ass'y and the Winding Base plate Upper Ass'y.

1)Peel off the IC Tape (Black) (CP5.0).

2)Remove the Shutter Setscrews (69123066) X 2 and the Shutter (1AD25000).

[Notes on Shutter Handing]

a) The Shutter blades are precision parts. Never touch them with your finger or a tool.

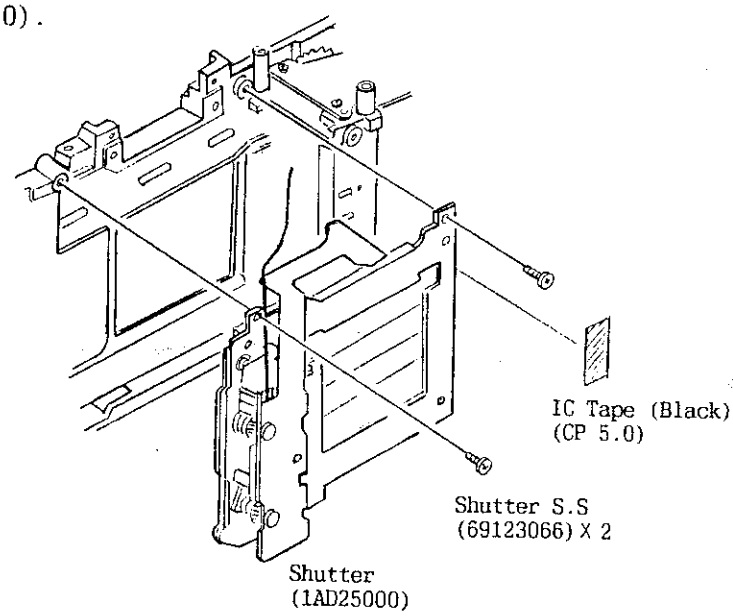


Fig.33

[Position of IC Tape (Black) Glued]

a) At reinstalling the Shutter Ass'y, be sure to attach IC Tape (Black) to the position as shown in Fig.34; otherwise, the light leaks.

① Mg ⊕ (V_B)

② Second Curtain Mg

③ X Contact

④ First Curtain Mg
Black lead-wire (GND)

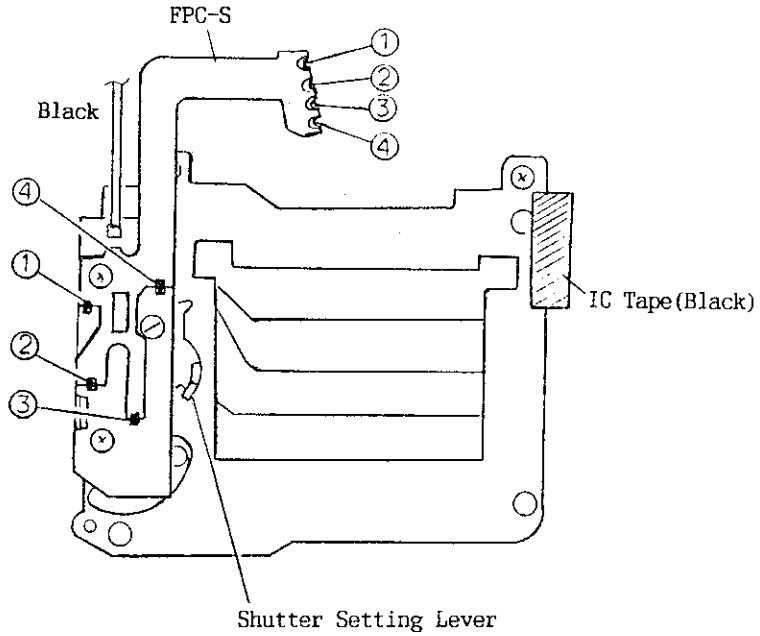
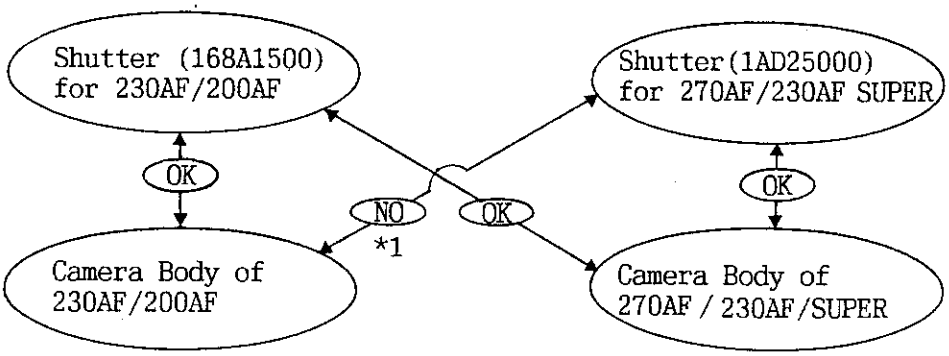


Fig.34

[Notes on Use of Shutter]

The Shutter (1AD25000) for 270AF / 230AF Super and the Shutter (168A1500) for 230AF/200AF are similar in shape but different in control system. Therefore, Please pay attention to the compatibility.



*1:Not interchangeability

[How to Identify Shutter Type]

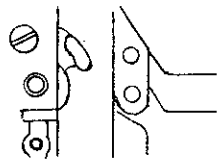
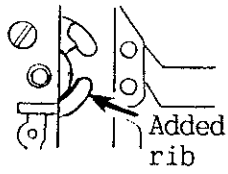
	Color of shutter magnet wire	Material of shutter blades	Shape of shutter setting lever (See Fig.34)
Shutter (168A1500) for 230AF/200AF	Copper	Plastic used partially	* 
Shutter (1AD25000) for 270AF /230AF SUPER	Silver gray	Changed to metal	* 

Fig.35

*: View of Shutter in set position

[FPC- S]

The FPC-S (16950300) for 200AF is used in 270AF / 230AF Super. Before installing it, however, cut the GND pattern of the FPC-S in the two positions as shown.

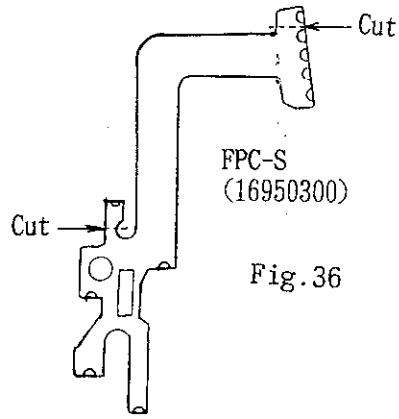


Fig.36

B-9 Disassembly of Rewind Mechanism

B-9-1 Removal of Rewind Base Plate Upper Ass'y

1) Remove the Rewind Base Plate Upper Setscrews (69113076) X 2 and (69313066) and take off the Rewind Base Plate Upper Ass'y (1ADAA200).

2) Remove the RW Gear (1) (16868200) and the RW Gear (2) (16868300).

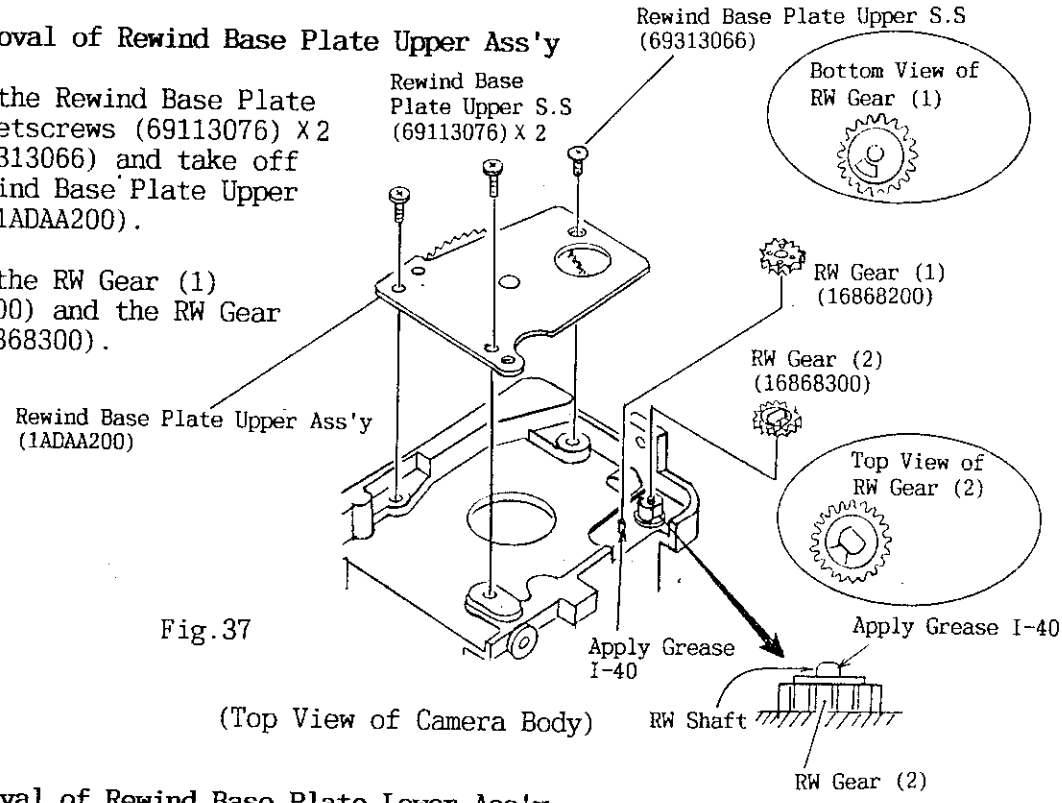


Fig.37

(Top View of Camera Body)

B-9-2 Removal of Rewind Base Plate Lower Ass'y

1) Remove the Rewind Base Plate Setscrews (69113076) X 2 and the Rewind Base Plate Lower Ass'y.

2) Remove the RW Gear (S) (16868800), RW Gear (2) (16868300) and RW Shaft (16868400)

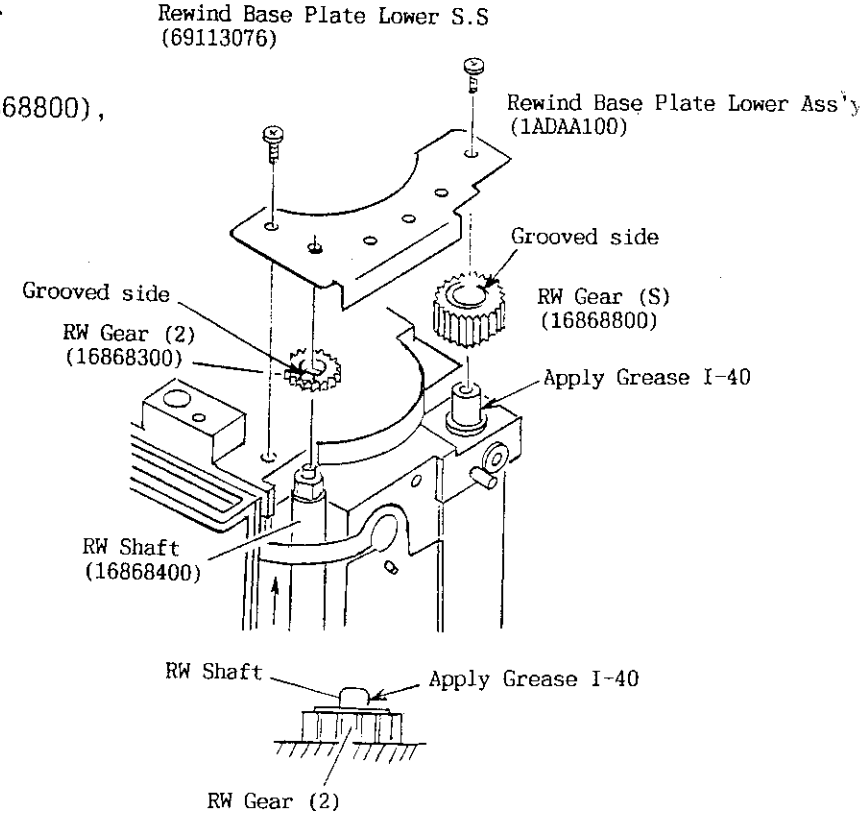


Fig.38

(Bottom View of Camera Body)

B-10 Removal of DX FPC

B-10-1 Removal of Back Cover Mechanism

1)Remove the Lock Plate Cover Setscrews (69215579) X2 and the Lock Plate Cover (16815800).

2)Remove the Strap Holder Setscrews (69124076) X4 and the Strap Holder (16810710).

3)Remove the Back Cover Lock Spring (16815510), Back Cover Release Ass'y (168A1400), Back Cover Release Button (16815411) and the Back Cover Lock Button Spring (16815610).

4)Remove the Back Cover Lock Lever (16816300) and the Back Cover Lock Lever Spring (16816401).

Notes:

a) Take care not to deform the Back Cover Switch Contact.

b) Take care not to lose the Back Cover Lock Spring, Back Cover Lock Button Spring or Back Cover Lock Lever Spring, which can spring off.

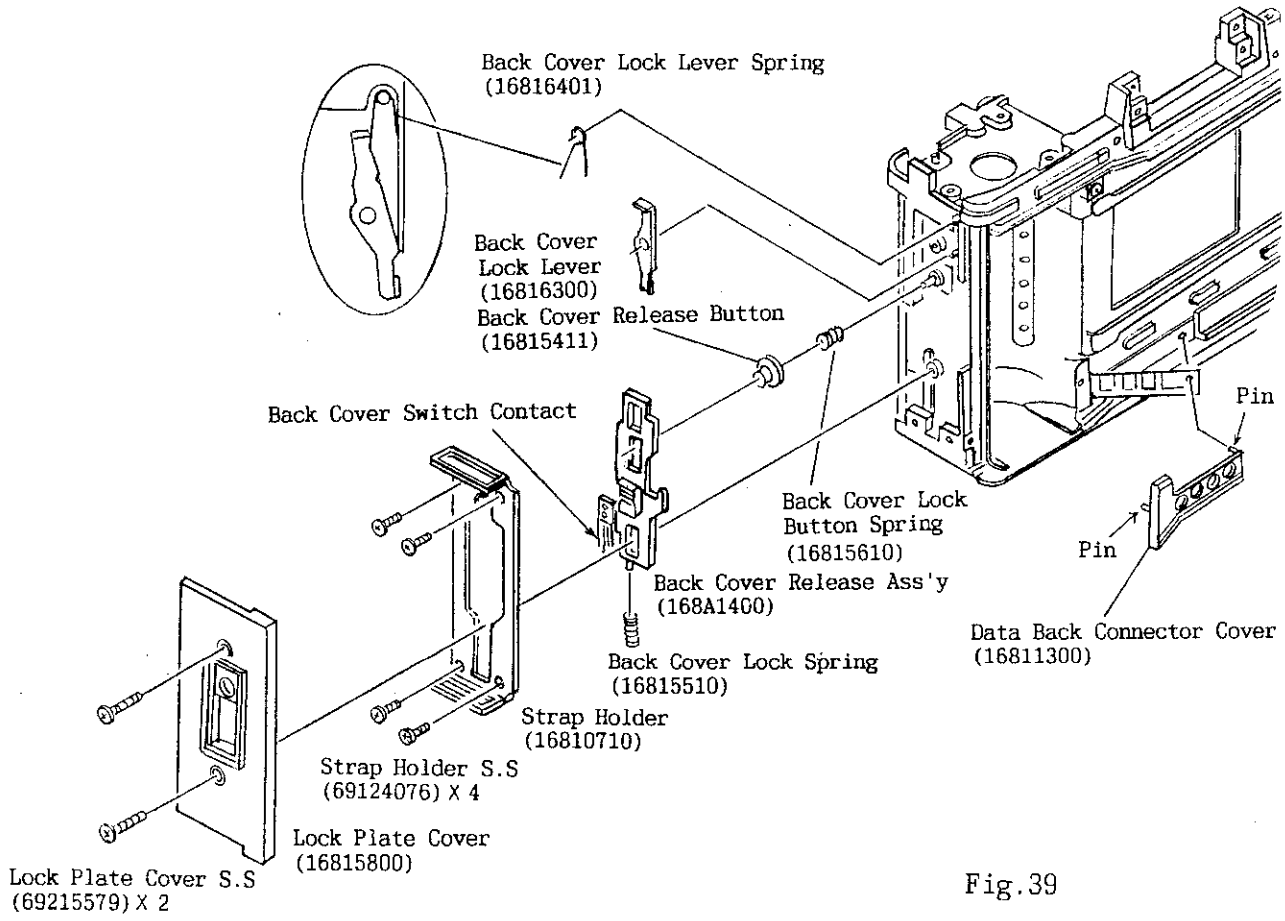


Fig.39

5)Remove the Data Back Connector Cover (16811300). (See Fig.39)

Notes:

a) The Data Back Connector Cover is press-fitted. Remove it with a screwdriver or the like with care not to damage the Body.

b) In removing the Data Back Connector Cover, move it in parallel not to break the two pins.

6)Remove the DX Retaining Plate Setscrew (69112576) X2, DX Retaining Plate (16811700) and DX Retaining Spring (16811600).

7)Peel off the DX FPC (1AD50600) on the right side of the Body and remove the DX FPC.

8)Remove the DX Contact Pin (16811800) X6 and DX Contact Holder (16811500).

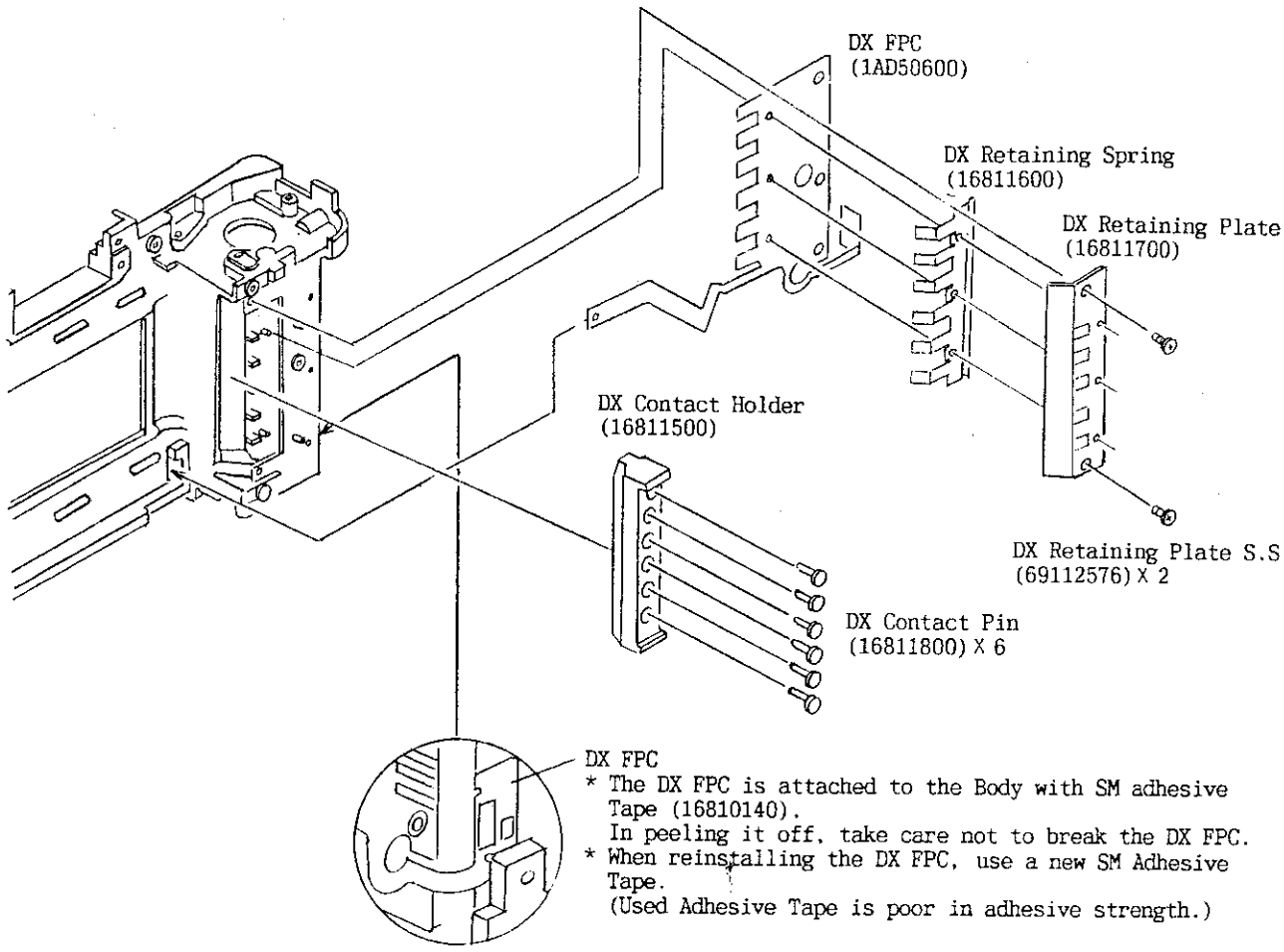

DX FPC
(1AD50600)
DX Retaining Spring
(16811600)
DX Retaining Plate
(16811700)
DX Contact Holder
(16811500)
DX Retaining Plate S.S
(69112576) X 2
DX Contact Pin
(16811800) X 6
DX FPC
* The DX FPC is attached to the Body with SM adhesive Tape (16810140).
In peeling it off, take care not to break the DX FPC.
* When reinstalling the DX FPC, use a new SM Adhesive Tape.
(Used Adhesive Tape is poor in adhesive strength.)

Fig.40

B-11 Disassembly of Mirror Box Ass'y

Caution:

Be sure to observe the following instructions on disassembly of Mirror Box Ass'y!

a) If you do not have an AF adjuster, 45-degree adjuster/ tester for the Main Mirror or other necessary tools, do not remove the Main Mirror, Sub Mirror, AF Module, MB Base Plate Ass'y or MU Base Plate Ass'y.

b) Do not change the 45-degree position of the Main Mirror or the position of the Sub Mirror; otherwise, Auto Focusing trouble may occur.

c) Do not disassemble the AF Module (AF-FPC Ass'y). For a camera developing distance metering trouble, replace the AF-FPC Ass'y and adjust the position of the AF Module. If you do not have an AF adjuster, replace the Mirror Box Ass'y.

B-11-1 Removal of Penta Prism

1)Remove the parts of the Viewfinder as shown in Fig.41.

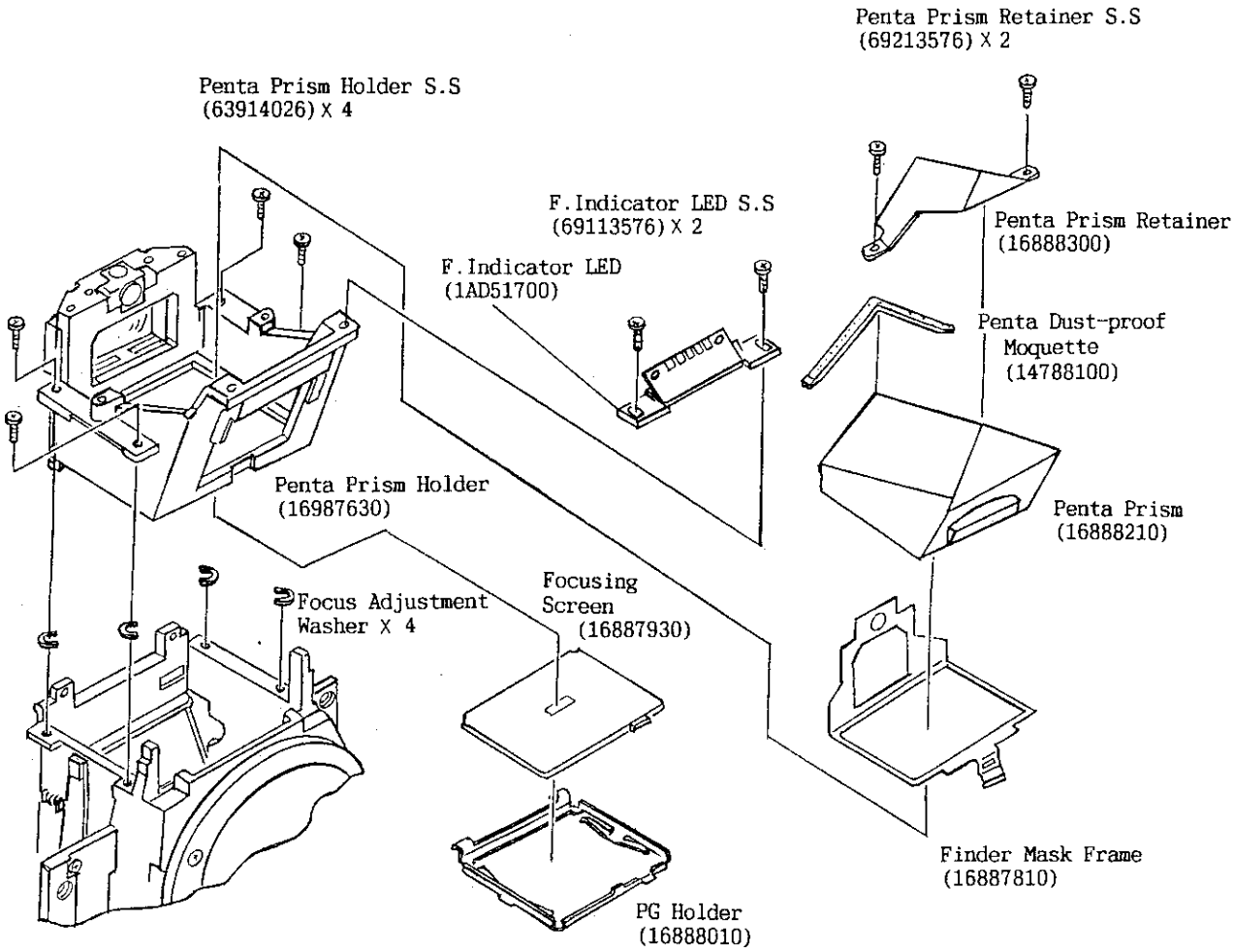


Fig.41

B-11-2 Removal of FC Base Plate Ass'y

1)Remove the Drive FPC Setscrews (63911526) X 2.

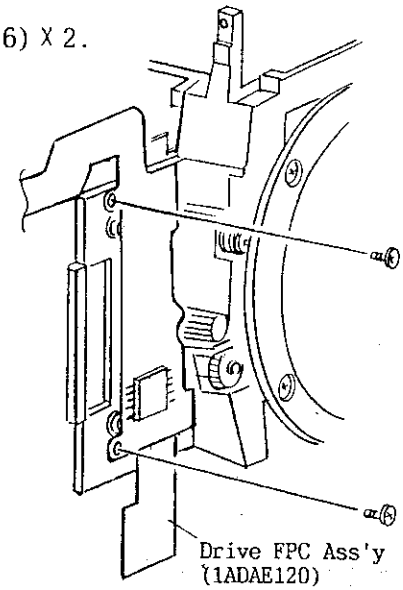


Fig.42

2)Open the Drive FPC in the direction of the arrow and unsolder the red and black lead wires.

3)Unsolder the soldered joints between the Drive FPC and the Aperture PI-FPC and remove the Drive FPC Ass'y (1ADAE120).

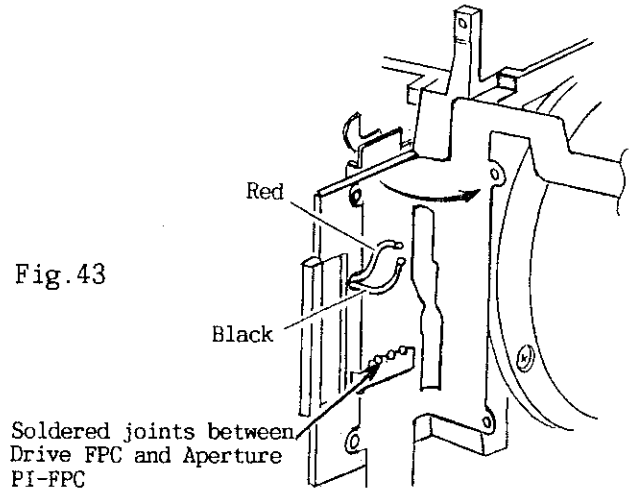


Fig.43

4)Remove the FC Base Plate Setscrews (61912226) X2 and (61812526) and take off the FC Base Plate Ass'y (168A5600).

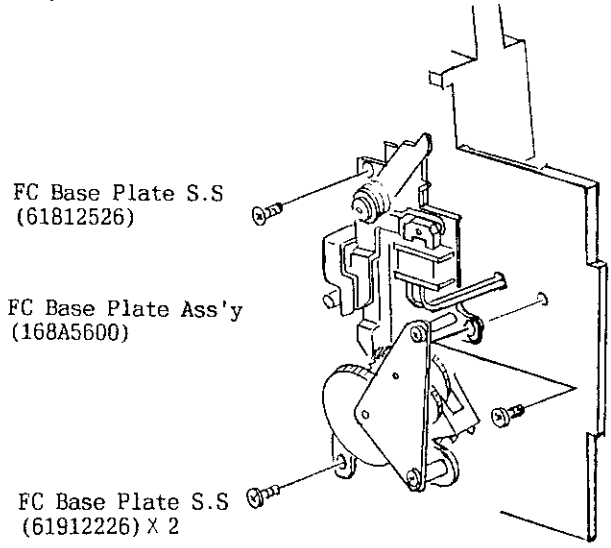


Fig.44

B-11-3 Removal of AF Driving Base Plate Ass'y

1)Unsolder the 4 soldered joints between the AF FPC and the AF PI-FPC.

2)Remove the GS Ring (66171522), Flexible Plate Supporter Setscrew (61911622) and the Flexible Plate Supporter (16870900).

3)Remove the AF Motor Damper (16877100). (See Fig.46)

4)Remove the AF-FPC (S) Ass'y Setscrews (61912228) X 3 and the AF-FPC (S) Ass'y (1ADAS000).

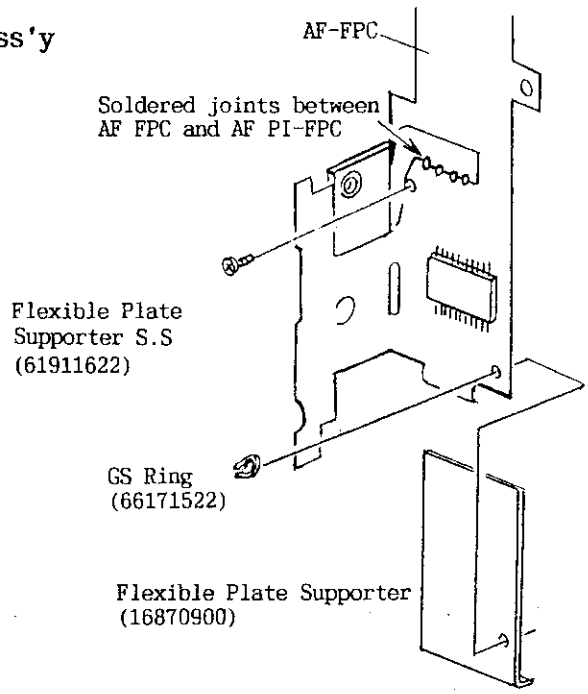

AF-FPC
Soldered joints between AF FPC and AF PI-FPC
Flexible Plate Supporter S.S (61911622)
GS Ring (66171522)
Flexible Plate Supporter (16870900)

Fig.45

Notes:

a) Never turn the AF Module adjusting screws; otherwise, the AF Module can be dislocated, thus causing Auto Focusing trouble. (See Fig. 46)

5)Remove the AF/ MF Contact Base Setscrew (61913526) and the AF/ MF Contact Base (168A2800). (See Fig.47)

6)Remove the L. Release Lever Shaft (16883900) and the L. Release Lever C (16883800). (See Fig.47)

7)Remove the AF Driving Base Plate Ass'y Setscrews (61913526) X2 and take off the AF Driving Base Plate Ass'y (1ADAB100). (See Fig.48)

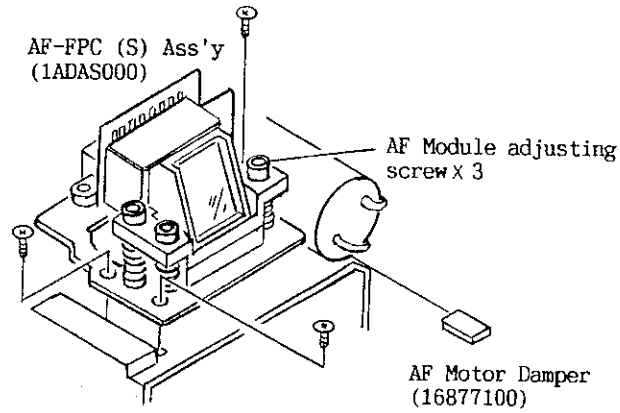


Fig.46

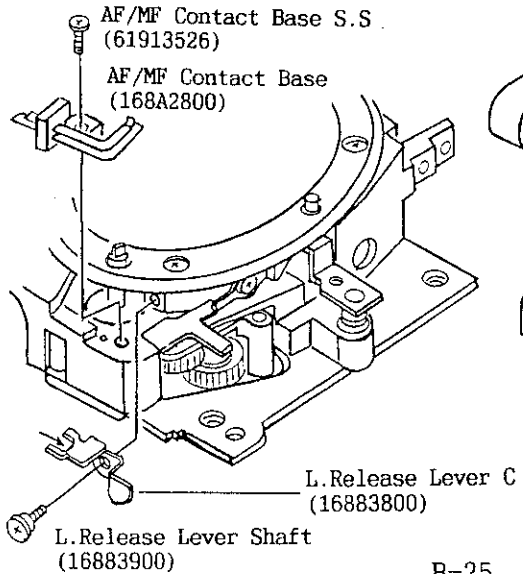


Fig.47

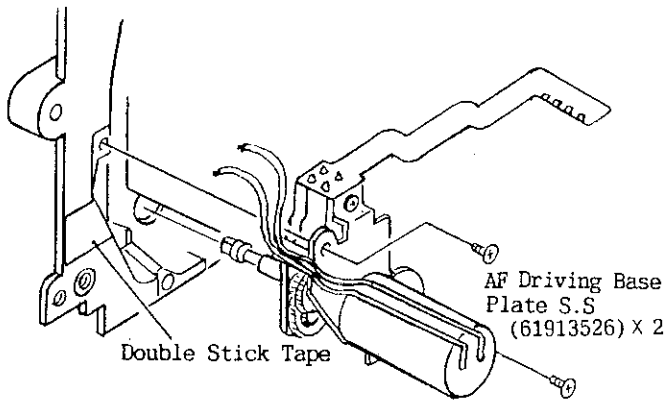


Fig.48

B-11-4 Removal of L. Contact Ass'y

1)Remove the parts shown in Fig. 49 in the indicated order.

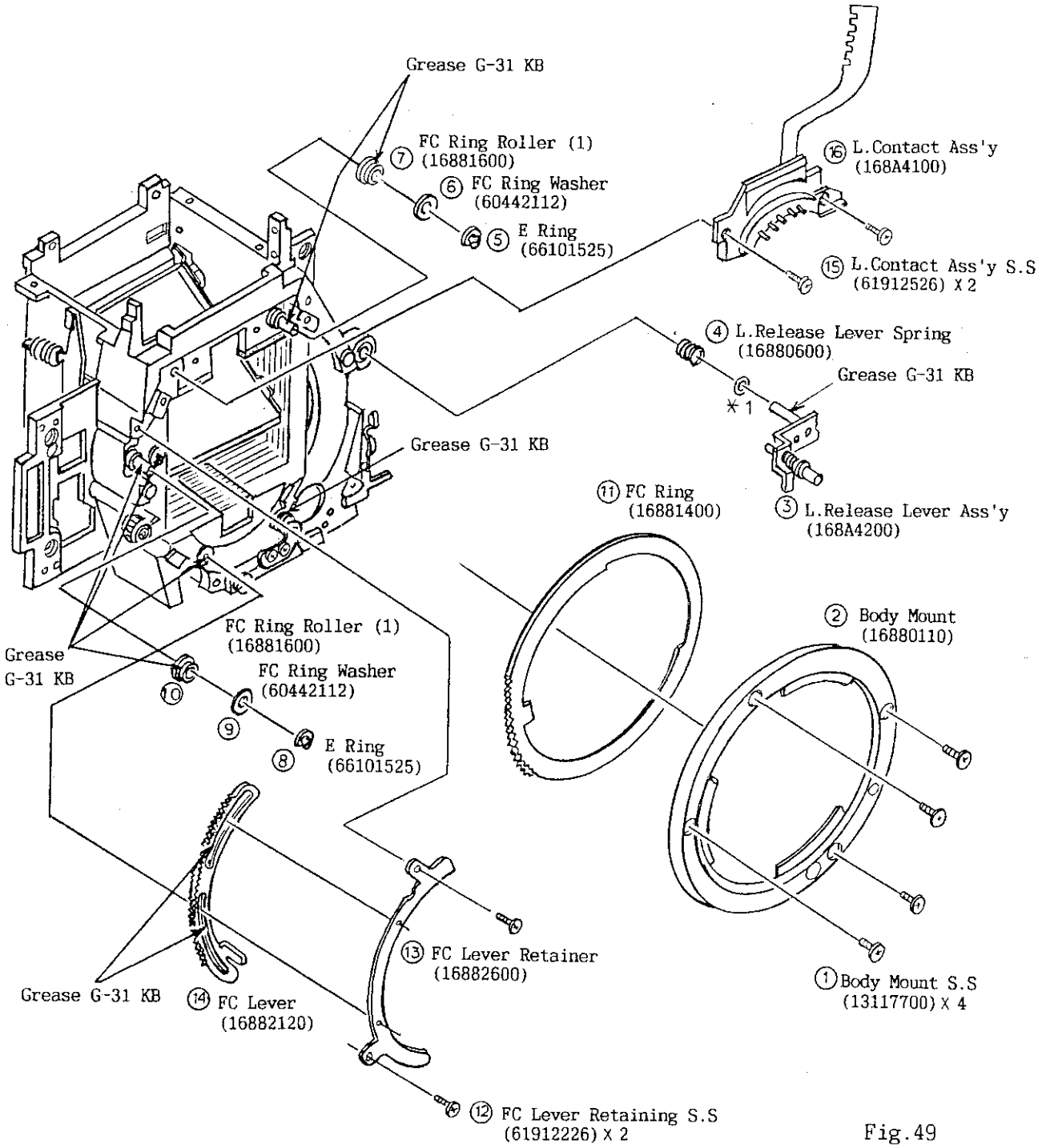

Grease G-31 KB
⑦ FC Ring Roller (1) (16881600)
⑥ FC Ring Washer (60442112)
⑤ E Ring (66101525)
⑯ L.Contact Ass'y (168A4100)
⑮ L.Contact Ass'y S.S (61912526) X 2
④ L.Release Lever Spring (16880600)
Grease G-31 KB
*1
Grease G-31 KB
⑪ FC Ring (16881400)
③ L.Release Lever Ass'y (168A4200)
② Body Mount (16880110)
FC Ring Roller (1) (16881600)
Grease G-31 KB
FC Ring Washer (60442112)
⑩
⑨
⑧ E Ring (66101525)
⑬ FC Lever Retainer (16882600)
① Body Mount S.S (13117700) X 4
Grease G-31 KB
⑭ FC Lever (16882120)
⑫ FC Lever Retaining S.S (61912226) X 2

Fig.49

*1 In the course of production, the Plain Washer (60111810) was added to smooth the operation of the L.Release Lever Ass'y.

B-12 Disassembly of Top Cover Ass'y

B-12-1 Removal of Accessory Shoes

1) Remove the Shoe Plate Spring (16820640).

Notes:

a) The shoe Plate Spring is glued (C-551).

2) Remove the Accessory Shoe Setscrews (63912822) X4 and the Accessory Shoe (Right) (16820210) and Accessory Shoe (Left) (16824010).

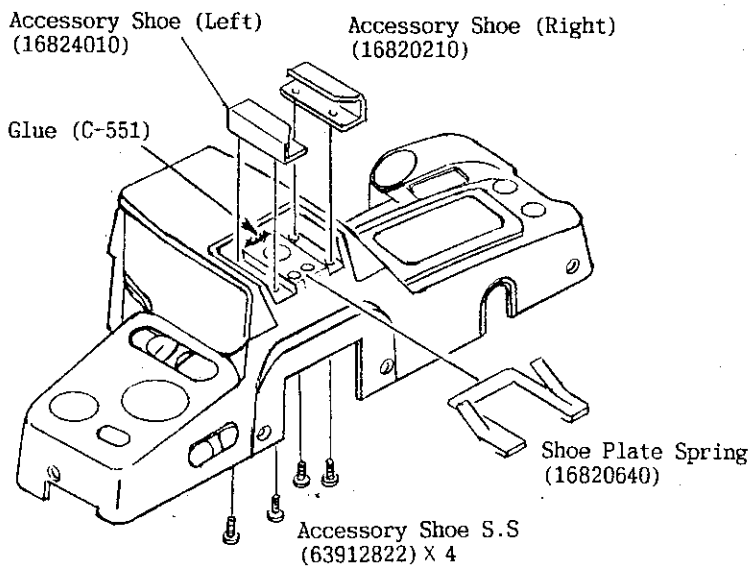


Fig.50

B-12-2 Removal of Top Cover FPC Ass'y

1) Unsolder the two purple lead wires coming from the Pop-up Switch.

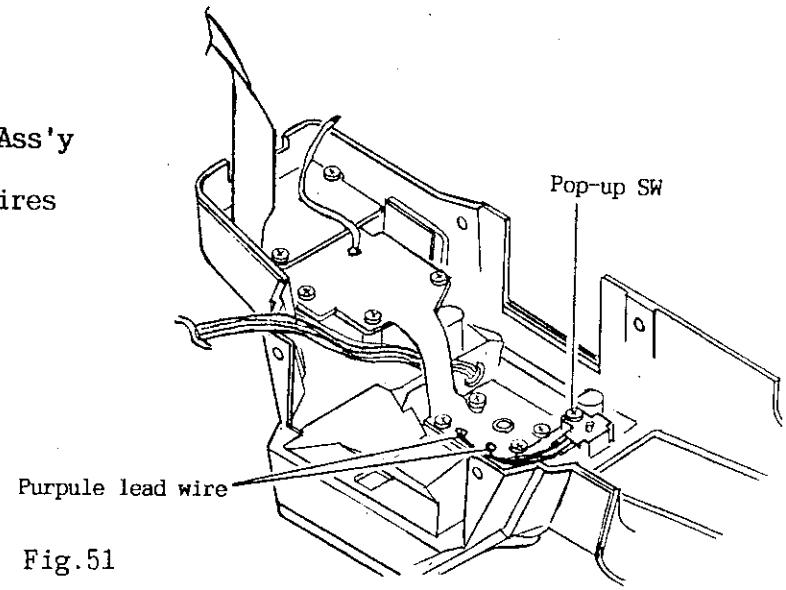


Fig.51

Notes:

a) Form the purple lead wires from the Pop-up SW so that they do not interfere with the area marked with " ▨ ". (See Fig. 52)

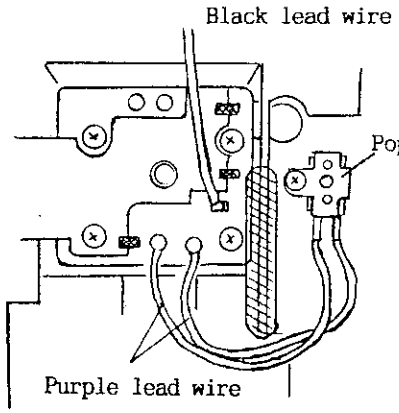


Fig.52

2)Remove the Pop-up SW Setscrew (69213076) and the Pop-up SW (1AD23600).

3)Remove the P. SW Cup (1AD23710).

4)Remove the Mode Button Back Plate Setscrews (69213076) X 3 and the Mode Button Back Plate (1AD22110).

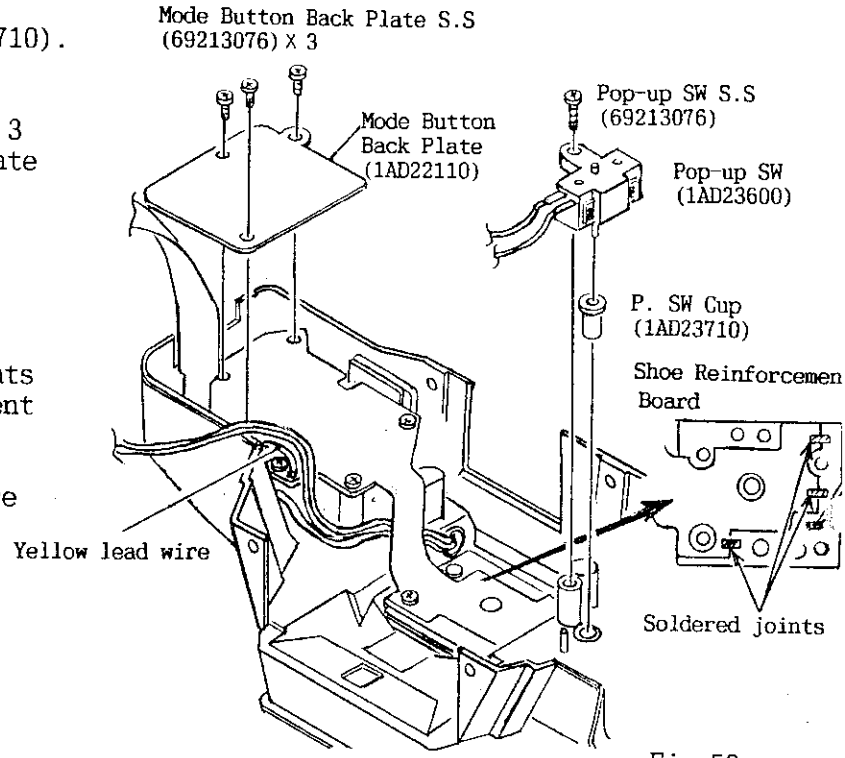


Fig.53

5)Unsolder the 3 soldered joints between the Shoe Reinforcement Board and the Top Cover FPC.

6)Unsolder the yellow lead wire (coming from Flash FPC).

7)Remove the Top Cover FPC Setscrews (69213066) X3 and take off the Top Cover FPC Ass'y (1ADAE190).

8)Remove the S.SW Cup (1AD23410).

9)Remove the Shoe Reinforcement Board Ass'y (1ADAE100).

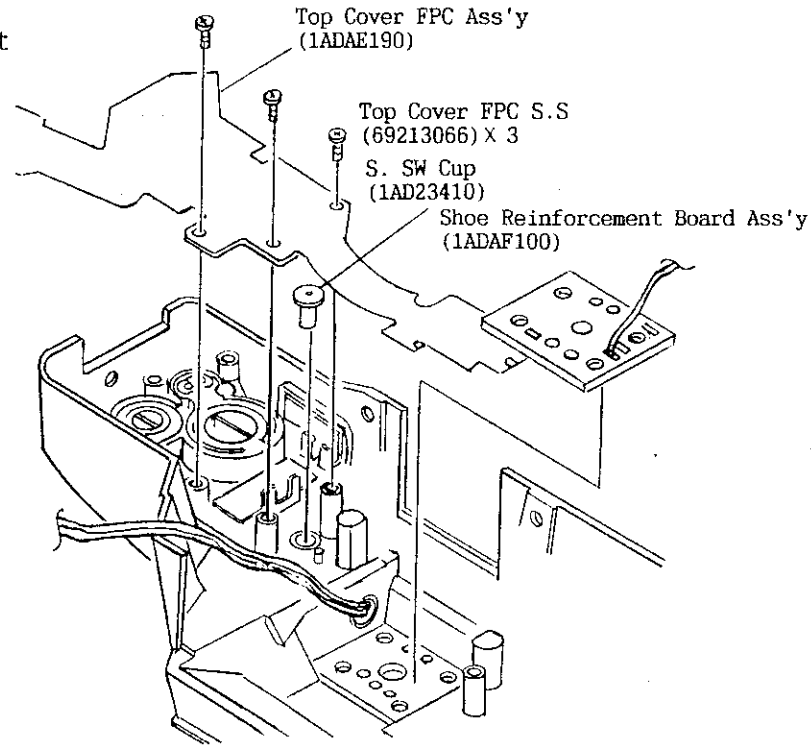


Fig.54

B-12-3 Removal of Flash Ass'y

1)With the Flash in the up position, remove one Ⓐ of the Flash Cover Setscrews (69113576).

2)With the flash in the down position, remove the other two, Ⓑ and Ⓒ, of the Flash Cover Setscrews and take off the Flash Cover (1AD22510).

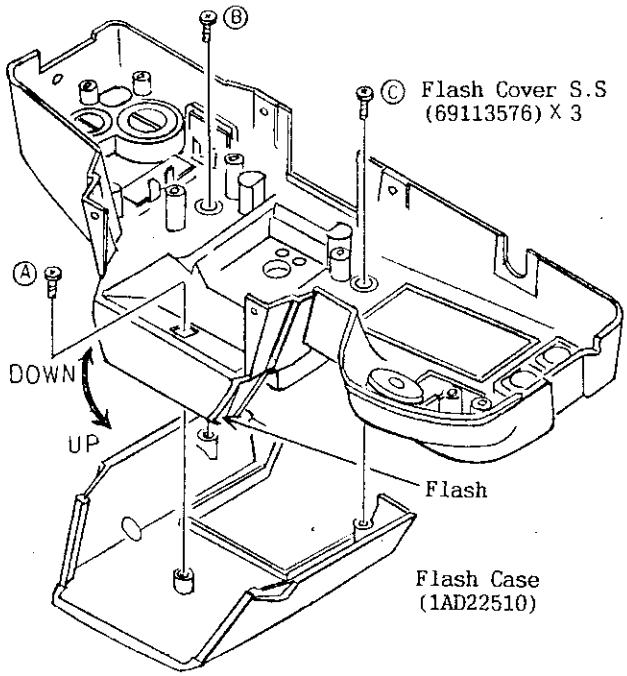
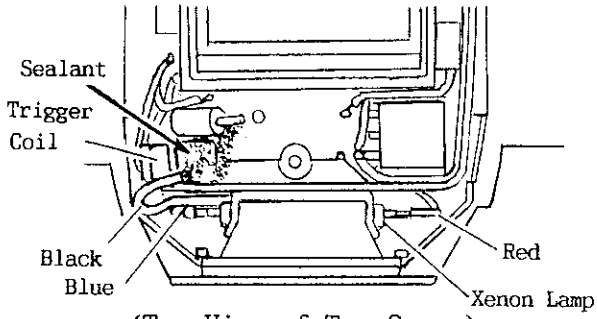


Fig.55

3)Unsolder the red and blue lead wires soldered at the ends of the Xenon Lamp.

4)Remove the sealant (white silicone) applied on the Trigger Coil.

5)Unsolder the black lead wire soldered on the Trigger Coil.



(Top View of Top Cover)

Fig.56

Notes:

a) After soldering the black lead wire to the Trigger Coil, apply sealant to prevent spark. (See Fig. 56)

6)Remove the Flash FPC Ass'y (1ADAE170).

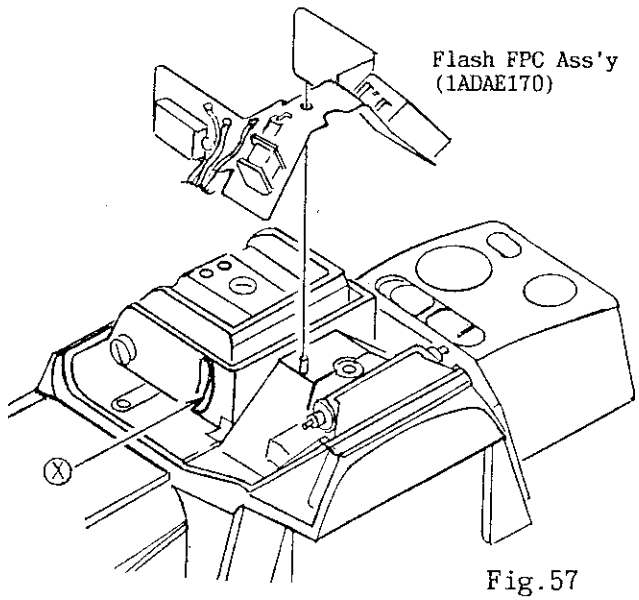


Fig.57

Notes:

a) The Flash FPC Ass'y is attached to the Flash Ass'y with Double Stick Tape.

[Notes of Reinstallation of Flash FPC Ass'y]

a) Take care that Double Stick Tape on the Flash FPC Ass'y does not interfere with the hole shown with Ⓧ on the Top Cover. (See Fig. 57)

b) Affix Double Stick Tape in the positions shown in Fig. 58 on the back of the Flash FPC Ass'y.

c) Take care not to position the Double Stick Tape over the hole Ⓒ. (See Fig. 58)

(Back View of Flash FPC Ass'y)

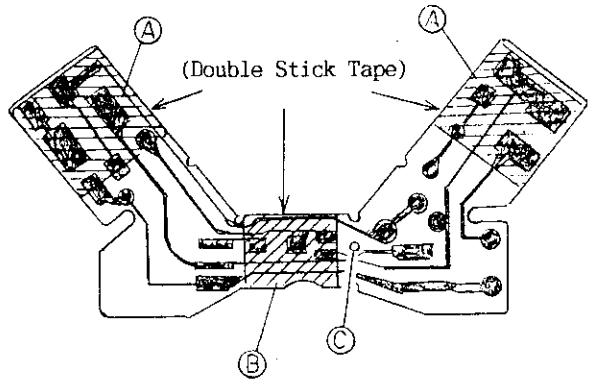
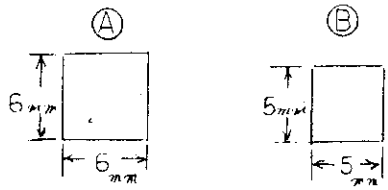


Fig.58



(Size of Double Stick Tape)

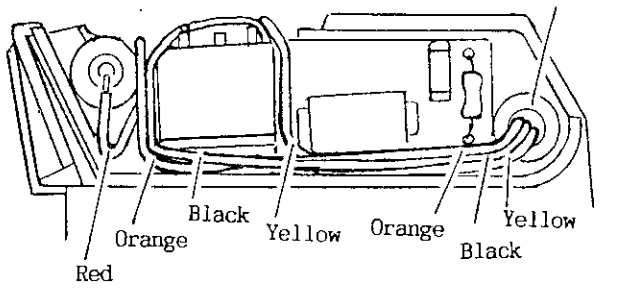
Fig.59

[Forming of Lead Wires on Flash FPC]

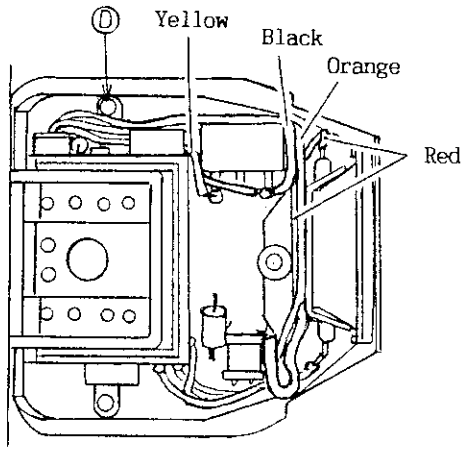
a) Lead the yellow, black and orange lead wires through the hole in the S. Base Shaft (Right). (See Fig. 59)

b) Form the orange and red lead wires as shown in Fig. 60. Take care that the black, yellow or orange lead wire does not interfere with hole Ⓓ.

c) Form the blue lead wire as shown in Fig. 61.



(Right side View of Top Cover)



(Top View of Top Cover)

Fig.60

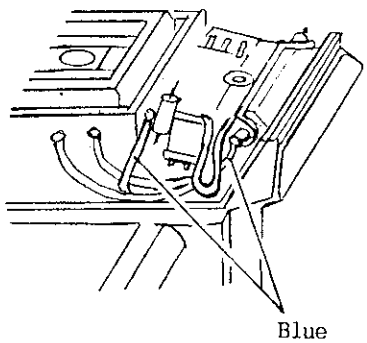


Fig.61

7)Remove the S.B Stopper (1AD22901) X 2.

8)With the Top Cover upside down, remove the CE Ring (66150425).

9)Remove the S.Base Shaft (Left) (1AD22801).

10)Remove the S.Base Shaft (Right) (1AD22700) while holding the Flash Ass'y.

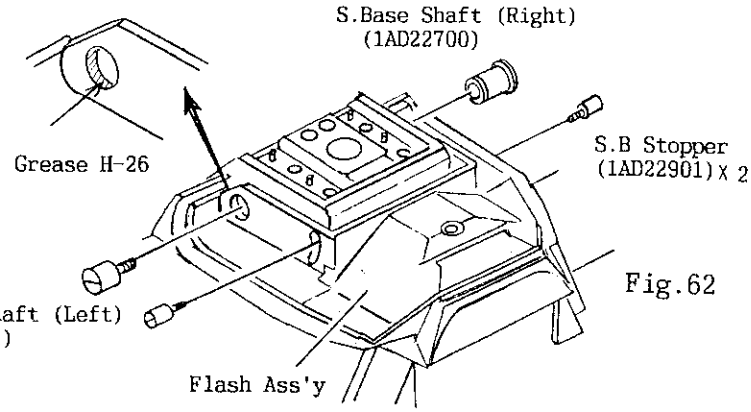


Fig.62

Notes:

a) Apply grease H-26 to the holes for S. Base Shafts (Right) and (Left). (See Fig. 62)

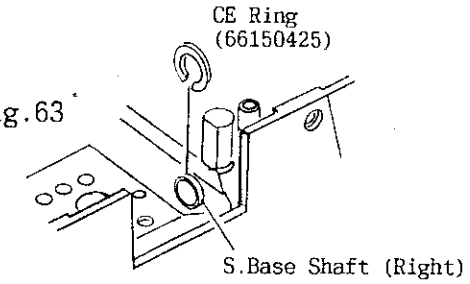


Fig.63

(Inside View of Top Cover Ass'y)

11)Remove the Flash Ass'y (1ADAD610).

12)Remove the Steel Balls (66703020) X 2, S.B Click Springs (1AD23300) X 2, and S.B Click Cup (1AD20300) X 2.

(Back View of Flash Ass'y)

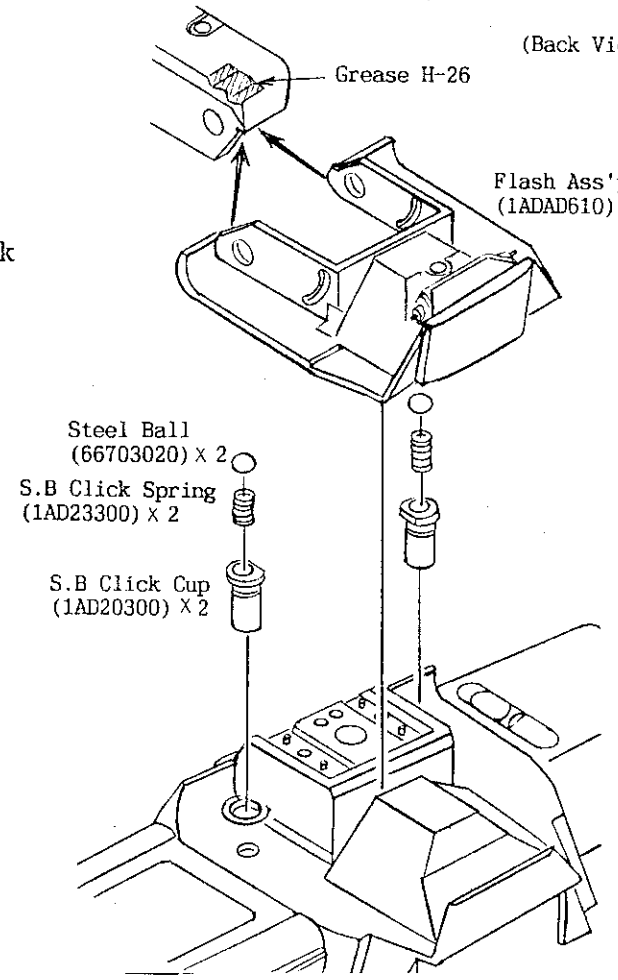


Fig.64

C REASSEMBLY AND ADJUSTMENT PROCEDURE

C-1 Reassembly of Assembly Parts

C-1-1 Winding Base Plate Upper Ass'y

1) Install the Double Winding Prevention Gear (16865320) on the Winding Base Plate Upper (A) Ass'y.

2) Fit Limit Lever Spring (16866900) to the Limit Lever (16866520), catch the Limit Lever Spring on the hook of the Limit Lever, and install them on the Winding Base Plate Upper (A) Ass'y. Engage the Limit lever Spring to the hook of the Winding Base Plate Uppor (A).

3) Engage the Charge Lever Spring (16866601) with the hook of the Charge Lever (16866200), and install the Charge Lever on the Winding Base Plate Upper (A) Ass'y.
Engage the Charge Lever Spring to the hook of the Winding Base Plate Upper (A).

4) Fit the Spool Friction Spring (16866001) on the Spool Gear (16865911), and install them on the Winding Base Plate Upper (A) Ass'y.

5) Assemble the Sprocket Gear (16865410), Washer (60112410) and the Spool Idle Gear (16865800) with the Winding Base Plate Upper (A) Ass'y.

6) Fit the Double Winding Prevention Gear Washer (601131110) to the Double Winding Prevention Gear.

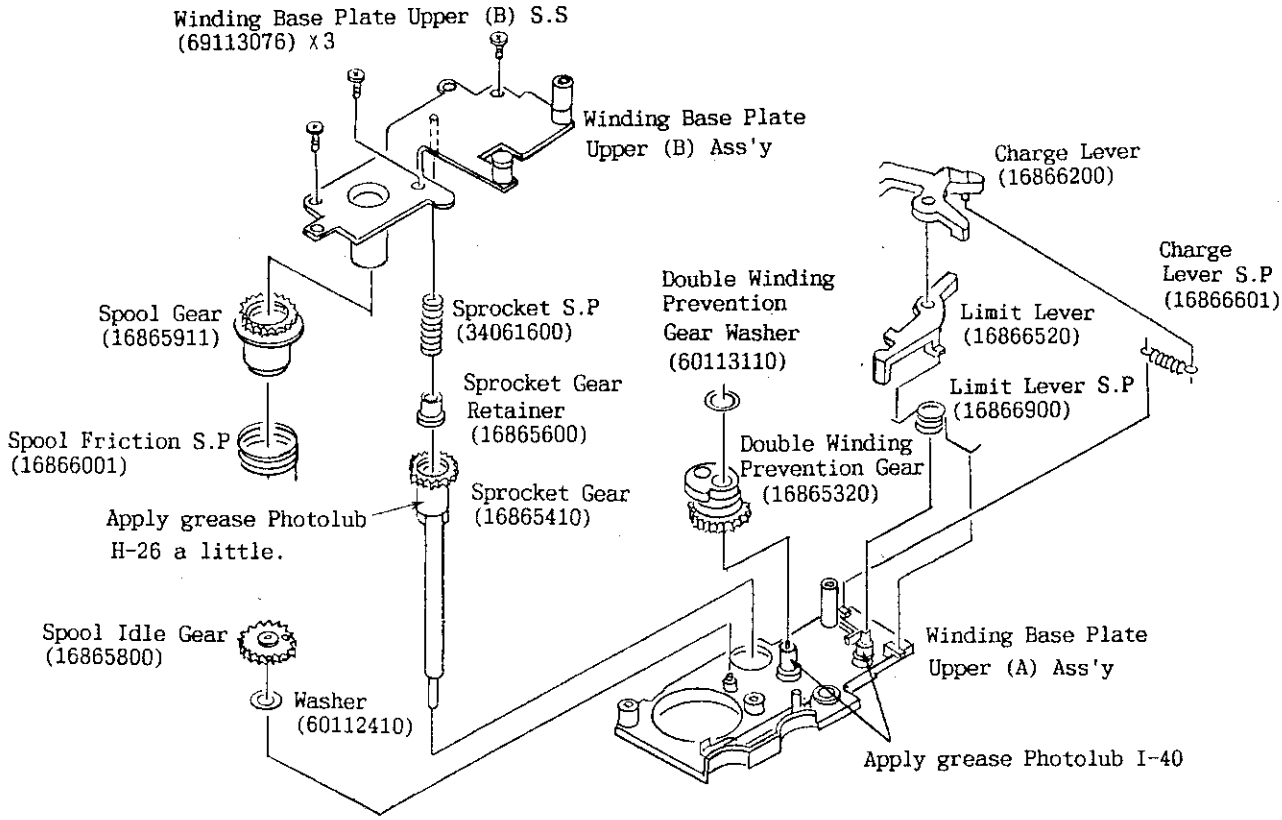


Fig.65

7)Fit the Sprocket SP (34061600) on the Sprocket Gear Retainer (16865600), combine the Winding Base Plate Upper (B) Ass'y with the Winding Base Plate Upper (A) Ass'y, and tighten the Winding Base Plate Setscrews (69113076) X 3.

[Sprocket Incorporating Position]

1)Lock the Double Winding Prevention Gear (16865320) with the Limit Lever (16866520).

2)Incorporate the Sprocket Gear (16865410) with its mark in the position as shown in Fig.66.

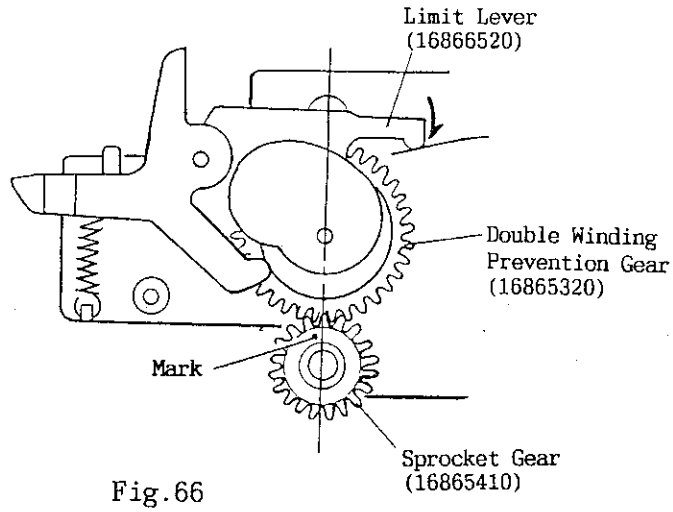


Fig.66

C-1-2 Winding Base Plate Lower Ass'y

1)Install the Reduction Gear 1 (16862410) on the Winding Base Plate Lower (A) Ass'y.

2)Fit the E Ring (66101225) on the Winding Motor (16869600).

3)Attach the Winding Motor to the Winding Base Plate Lower (A) Ass'y, and tighten the Winding Motor Setscrews (61913526) X 2. Lock the screw by applying Three-Bond 1401.

4)Fit the Motor Friction Ass'y (168A1710) on the shaft of the Winding Motor, and tighten the Motor Friction Setscrew. Lock the screw by applying glue C-551.

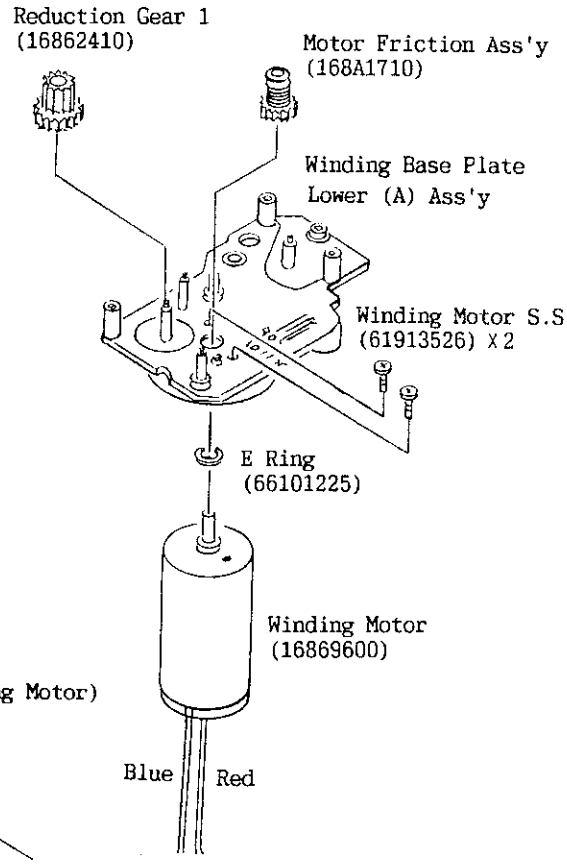


Fig.67

Note:

a) Solder the Red and Blue Lead Wires of the Winding Motor in the positions as shown in Fig.68

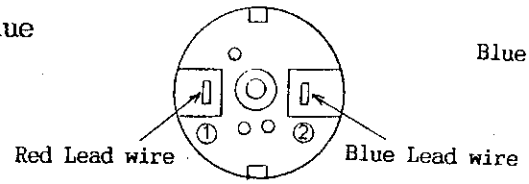


Fig.68

(Motor Friction Ass'y)

[Note on Handling Motor Friction Ass'y]

a)When removing the Motor Friction Ass'y from the Winding Motor, be sure not to loosen the Motor Friction Setscrew by more than one turn.

*Friction torque ------ 70 ~ 150gf.cm

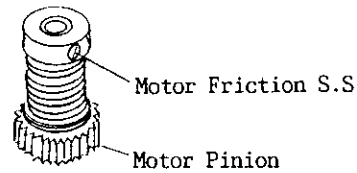


Fig.69

5)Install the W Shaft Ass'y (168A1800) on the Winding Base Plate Lower (A) Ass'y.

6)Install the Sector Gear (16863901), Sector Retainer (16863610), and Sector Ass'y (168A1900) on the Winding Base Plate Lower (A) Ass'y.

7)Engage the Sector Gear Spring (16863501) with the hook of the Sector Gear. Then engage the other end of the spring to the post on the Winding Base Plate Lower (A).

8)Install the Reduction Gear 2 (16862501), Clutch Gear Ass'y (168A2300), and Reduction Gear 3 Ass'y (168A1610) on the Winding Base Plate Lower (A).

9)Install the RW Lock Lever (1) Spring (16861310), R. Change Release Lever (16861410), RW Lock Lever(2) Spring (16861510), and R. Change Hook (16861210) on the Winding Base Plate Lower (A) Ass'y, and engage the spring.

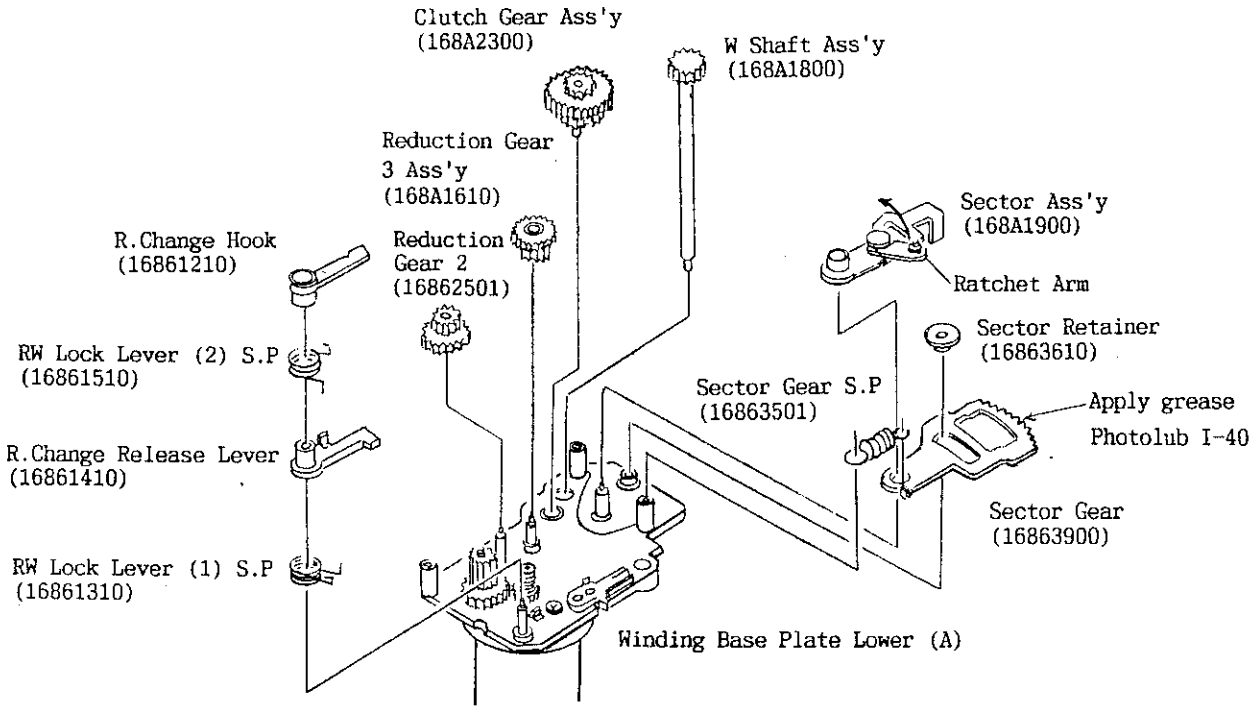


Fig.70